Cash, Credit, or Cell Phone? How to Influence Public Preferences About Payment Systems

Sarah E. Waldeck & Erik Lillquist

ABSTRACT

Cash, Credit, or Cell Phone? How to Influence Public Preferences About Payment Systems examines how the government can influence the public's choice of a particular payment system: not only existing systems like credit and debit cards, but innovative products such as stored value cards, electronic checks and electronic money. The success or failure of a new payment system can have a large economic impact, with shifts toward electronic payment options in particular having the potential to save up to one percent of a nation's gross domestic product. For the United States, that translates to approximately one hundred billion dollars worth of savings.

Whether a new payment system succeeds or fails depends upon social acceptance; that is, consumers and merchants have to simultaneously embrace the new payment option. Government action, both direct and indirect, can strongly influence consumer and merchant behavior. Whether and how the government affects payment preferences depends on whether the government is acting as fiduciary, seller, or law-maker; its precise goal; and the particular sort of payment system at issue. Depending on the situation, the government may (1) provide information that allows individuals to coordinate behavior, (2) pass legislation or adopt policies aimed at reducing concerns about a particular system, (3) provide incentives to induce individuals to adopt new payment systems, or (4) force change by eliminating or curtailing the older payment form. *Cash, Credit or Cell Phone?* suggests that in the realm of payments, governmental efforts to influence behavior will be most successful if they force change, not if they gently influence public preferences. This conclusion runs counter to the common wisdom in the social norms literature that law most effectively influences behavior when it promotes incremental advancement, not wholesale change.

Because payment methods are poised to continue the massive evolution that has occurred over the past twenty-five years, advocates of new systems are increasingly likely to attempt to involve government in promoting their fledging payment mechanisms. *Cash, Credit or Cell Phone?* suggests that government intervention, although often successful, is usually unwise for at least three reasons. First, technology moves quickly and the government usually moves slowly. Second, with a bit of time, new payment systems that are sufficiently advantageous to the public are likely to flourish without governmental intervention. Third and finally, governmental intervention may have the unintended consequence of undermining the incentive to invest in new payment technologies in the first instance.

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Sarah E. Waldeck & Erik Lillquist[1]

Introduction

Open your wallets. Many of you have a couple of credits cards, an ATM or debit card and, if you live in a metropolitan area with a large transit system, a stored value card that you use to pay the transit fare. You probably have some cash as well, maybe a few singles, a couple of fives, and a twenty. What you almost certainly do not have is a two-dollar bill, even though Congress made the bill legal tender as far back as 1862.[2]

While most of us are familiar only with the two-dollar bill issued in 1976, the denomination actually has a long history in this country, one that is best summarized as a "flop." The bill has been extraordinarily unpopular since its beginning. In 1862, the bill featured a portrait of Alexander Hamilton, the Treasury Secretary who was killed in a duel by Aaron Burr. Remarkably, the story that the bill was "bad luck" quickly took hold. In 1869, the Treasury replaced Hamilton's picture with one of Jefferson, but most Americans still refused to use the bill, or, if they did, they tore the corner off in a practice that was said to break the "curse."[3] In 1966, the Treasury cited "a lack of public interest" and formally discontinued the bill.[4] At that time, two-dollar bills accounted for less than one-third of one percent of all circulating currency. Two-dollar bills were used so

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[1] Order of attribution is random. Both of us are professors of law at Seton Hall University. We would like to thank, in no particular order, Jake Barnes, Stephen Lubben and Charlie Sullivan for reading and (at least in the case of the first two) providing helpful comments on prior drafts of this article. We would also like to acknowledge the hard work of our research assistants, Sydney Peck, Randall Samson, and Alison Weyer. In addition, we are indebted to participants in a panel at the 2005 Law and Society Association Annual Meeting, as well as attendees at the Annual Meeting of the 2006 Canadian Law and Economics Association. Finally, we would be negligent if we failed to acknowledge the Dean's Summer Grant Fund for its generous support.

[2] Act of February 25, 1862. In 1776, the Continental Congress authorized issuances of $2 denominations in "bills of credit for the defense of America." Suzanne J. Stone, ECONOMIC REVIEW, March/April 1976, at p. 20 (citing U.S. Department of the Treasury, HISTORICAL NARRATIVE ON THE $2 BILL (Washington, D.C. Nov. 3, 1975)).

[3] Timothy Schellhardt, *Finally, Government Mulls Action to Make the Greenback Go Farther*, WALL STREET JOURNAL, 1973.

[4] *Two Dollar Bill Scratched Due to 'Limited Interest,'* WALL STREET JOURNAL, Aug. 11, 1966, at 5.

infrequently that their average life was six years, compared to 18 months for a one dollar bill.[5]

In 1976, ten years after the government discontinued the bill, efficiency concerns prompted the Treasury to bring it back. The Treasury argued that, by replacing about half of the one-dollar bills with the equivalent dollar amount of two-dollar bills, it would save between four and seven million dollars each year (in 1976 dollars).[6] The Treasury further suggested that individuals would experience efficiency gains as well. Rising inflation meant that one-dollar bills purchased less and less, and a two-dollar bill was expected to facilitate cash transactions and decrease business operating costs by reducing the number of bills that retailers and banks handled.[7] Although the bill was issued in 1976 and featured the signing of the Declaration of Independence, the Treasury stressed that the reissue "was not intended as simply a commemorative act for this year, but rather signifies the permanent addition of another U.S. denomination." The Treasury further emphasized that it was printing a large number of the bills, so that enough would be available for widespread use.[8]

The new two-dollar bill was so poorly received, however, that by 1982, Federal Reserve banks still had about half of the original bills in their vaults, awaiting circulation. Nothing captures the failure of the bill more aptly than the Treasury website itself. The website lists "Why is the $2 bill no longer in circulation?" as one of the most frequently asked questions. The Treasury responds by noting that, contrary to popular belief, the bill still circulates, but:

> The key for successfully circulating the two-dollar bill is for retailers to use them just like any other denomination in their daily operations. In addition, most commercial banks will readily supply their retail customers with these bills if their customers request them in sufficient volume to justify stocking them in their vaults. However, neither the Treasury Department nor the Federal Reserve System can force the distribution or use of any denomination of currency on banks, businesses, or individuals.[9]

The success of the two-dollar bill depends, in other words, on whether individuals choose

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[5] Stone, *supra* note 2, at 21.
[6] Schellhardt, supra note 3.
[7] Schellhardt, supra note 3.
[8] *Treasury Will Resurrect the $2 Bill Next April*, WALL STREET JOURNAL, Nov. 4, 1975, at 23.
[9] http://www.treas.gov/education/faq/currency/denominations.shtml (last visited Sept. 4, 2006).

to use the bill in the first instance. Over the past thirty years, they have refused to.

In retrospect, the Treasury's concern with the loss of purchasing power for the one-dollar bill and the efficiency gain from switching to the two-dollar bill seem quaint. The past thirty years have seen a major shift in the ways consumers pay for their purchases, both large and small, and these changes have vastly decreased the need for a switch to the two-dollar bill. Through the 1970s, checks and cash dominated the world of payments. Since that time, though, financial institutions have introduced numerous alternative payment schemes, such as credit cards, debit cards, electronic money, electronic checks, and automated clearing house transactions, all of which have lessened the need for cash and checks.

In coming years, we are likely to see increased marketing of new electronic payment products. Since the 1990s, banks and other payment service providers have been trotting out (with varying success) new payment products such as stored value cards, payroll cards, electronic checks, electronic money, and the electronic truncation of checks. During the remainder of this decade, we are likely to see the use of even more sophisticated payment systems that function through cell phones or through small electronic transmitters found on our keychains. Many of these products are already in widespread use in foreign countries. Indeed, some payments providers have already begun to discuss the possibility of payment using biometric devices that would identify payers through their fingerprints or other physical characteristics. The open question is whether, like credit cards and debit cards, these new payment methods will go into widespread use in the United States or whether they will suffer the fate of the two-dollar bill.

The success or failure of each of these payment systems has a potentially large economic impact. One recent study concluded that the move to electronic payment systems can save up to 1% of a country's GDP.[10] Success or failure, though, depends not just on economics but upon social acceptance. For instance, the recent growth in the usage of debit cards has been directly linked to consumers' willingness to not merely use debit cards to withdraw cash from bank accounts but to make actual purchases with the

[10] David Humphrey et al., *Benefits from a changing payment technology in European banking*, __ J. BANKING & FIN. ___ (forthcoming 2005) (manuscript at 2) (suggesting possible savings of up to 1% of national GDP, and documenting averge savings of 0.38% of national GDP).

cards, something unheard of just ten years ago.[11] Similarly, the relatively spectacular failure of electronic money "stored value cards" in an experiment on the Upper West Side of Manhattan in the late 1990s is a striking reminder that any payment system, no matter how technologically savvy, will fail without customer support.[12] Even money itself is defined in social terms, as "any generally acceptable means of payment in exchange for goods and services and in settling debts."[13]

This article is about how the government and financial institutions can influence the public's choice of a particular payment system. Governmental action, both indirect and direct, affects what is "generally acceptable," that is, what forms of payment merchants will accept and consumers will use. As an example of indirect intervention, extensive legislation and regulation supports the checking system; Articles 3 and 4 of the Uniform Commercial Code, along with an array of federal laws and regulations, set the basic terms for most check transactions, while the Federal Reserve itself has long acted as a cornerstone in the process of check collection. In an indirect fashion, these kinds of government actions make a particular payment system more attractive. After all, if checks were more difficult to exchange, people would be less inclined to use them. Government support for the implementation of, or the infrastructure for, a particular payment system generally shifts consumer choices toward that system.

The government also "speaks" explicitly to the public in an effort to influence its preference for a particular payment system. For instance, through section 5103 of Title 31, the federal government speaks to the public about what we think of as "money"—pennies, nickels, dimes, quarters, and various denominations of federal reserve notes. The title provides that "United States coins and currency ... are legal tender for all debts, public charges, taxes, and dues."[14] As a result, all private and public creditors are

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[11] *See infra* text accompanying note XX.

[12] *See* Saul Hansell, *Got a Dime? Citibank and Chase End Test of Electronic Cash*, N.Y. TIMES, Nov. 8, 1998, at C1 (reporting that under $2 million was spent by consumers during the first year of the program); David M. Halbfinger, *West Siders Testing A Substitute for Pocket Change*, N.Y. TIMES, Oct. 7, 1997, at B1.

[13] FISHER, DORNBUSHCH & SCHMALENSEE, ECONOMICS 476 (2d ed. 1988)

[14] 31 U.S.C. § 5103. The constitutionality of the predecessor to § 5103 was addressed by the Supreme Court in a series of cases known, fittingly, as *The Legal Tender Cases*. *See* Kenneth W. Dam, *The Legal Tender Cases*, 1981 S. Ct. Rev. 367. As Professor Dam and others have noted, there is a substantial case to be made that the Framers intended that the Congress would not have the power to declare anything legal tender. *See id.* at 368; Farley Grubb, *The United States Constitution and Monetary Powers: An Analysis of*

required to accept federal currency in payment of debts, subject to a limitation of reasonableness for the time and means of payment.[15] As another example, a state transit authority may give preferential treatment to customers who use electronic payment, such as Metrocard or E-Z Pass.[16] Or, as a third example, Congress may pass statutes that alleviate consumer concerns about the risk of credit card fraud. In all of these instances, government attempts to influence preferences about particular forms of payment.

When it comes to emerging payment systems, the federal government has already begun to attempt to shape consumer choices. Just two years ago, Congress passed Check 21, which aimed to modernize our checking system by eliminating the journey that checks make by ground and air after they are written by the payor.[17] Check 21 streamlines check processing by requiring all banks and consumers to accept electronic substitutes for the original check. It seeks to alter consumer preferences in two different ways. First, as with the legal tender statute, Check 21 overrides consumer preferences: even if a bank or consumer would prefer to receive the original check, they cannot insist upon it.[18] Second, Check 21 requires that electronic substitute checks contain the legend, "This a legal copy of your check. You can use it the same way you would use the original check."[19] By educating the public that substitute checks have exactly the same legal force as the original checks they replace, the legend speaks directly to consumers. Check 21 is likely only the tip of the legislative iceberg. As providers of payment systems invest large amounts of capital in new technologies, they will continue to ask the

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the 1787 Constitutional Convention and How a Constitutional Transformation of the Nation's Monetary System Emerged, NBER Working paper Series No. 11783, available at http://www.nber.org/papers/w11783. Nonetheless, there is no doubt that, under existing law, § 5103 is constitutional. *See infra* text accompanying note XX.

[15] *See, e.g., Nemser v. New York City Trans. Auth.*, 530 N.Y.S.2d 493 (1988) (holding that, although the Transit Authority was required to accept payment of fares in United States currency, the Transit Authority could impose reasonable restrictions on when and where it would collect such currency and that, therefore, requiring the use of a token to pay a fare was permissible). In fact, the current understanding of the legal tender statute is that it applies only to pre-existing debts and that parties to an exchange need not agree to take cash.

[16] As we explain in more detail later, Metrocard is a stored value card that is used in the New York City subway system. E-ZPass is a stored value card that uses a radio frequency identification transponder to pay fares on major highways throughout the Northeast and Midwest.

[17] For an overview of the effects of Check 21, see Sarah Malmfeldt, *America Checks Into a New Banking Era With Check 21*, 17 LOY. CONSUMER L. REV. 209 (2005).

[18] 12 U.S.C. § 5003(a).

[19] 12 U.S.C. § 5003(b)(2).

government to help ensure that the technology is a hit with the general public.

In recent years, of course, much literature has discussed satisfaction and maximization of preferences. Most of this discussion falls well outside the scope of this paper. For our present purposes, we accept that preferences are malleable and examine the extent to which it is appropriate and possible for the government to influence public acceptance and use of new payment systems. We begin in Part I by describing in some detail the payment options that we discuss throughout the article. Part II models how merchants and consumers decide whether to adopt and use a particular payment form, and then introduces the complications of network effects and multi-sided platforms. In Part III, we briefly describe how, when it comes to payments systems, government may assume the roles of legislator, fiduciary, or seller. Part IV then describes the tools that government has available to influence consumer preferences. The Part discusses why steamrolling over consumer preferences is less risky in the world of payments than in other contexts. We argue that, in order for new payment forms to flourish, the government often has to force the public's hand by eliminating competing payment alternatives. Finally, Part V explores where the payment industry is headed over the next decade, predicts what actions the industry might call upon Congress to take, and cautions that, notwithstanding our analysis in Part IV, such governmental intervention will often be unwise.

Part I. Payment Options Defined

We begin by defining a few key terms. Throughout this paper, we will sometimes refer to charge cards, rather than credit cards. The term *charge card* means any card that permits the cardholder to make a payment using the card, with the amount charged to a third party, who then collects the funds from the cardholder. *Credit cards*, as we use the term, refer to a subset of charge cards in which the third party permits the cardholder to defer payment of the funds and instead allows the cardholder to finance the charge through a revolving line of credit.[20] This understanding of the relationship between

[20] As Professor Oren Bar-Gill has described credit cards, they "allow [the] holder to perform two distinct tasks: to transact quickly and efficiently, and to borrow—to finance a specific purchase, business, or way of

charge cards and credit cards accords with the historical development of such cards: charge cards, such as the Diners Club, American Express, and Carte Blanche cards, first arose in the 1950s as a way for (primarily) business travelers to make payments of lodging, food, and entertainment expenses without carrying cash.[21] Credit cards, as a subset of charge cards, arose a decade later with the introduction of the BankAmericard (later, the Visa card). As we will explore in more detail below, the availability of this line of credit helps to explain much of the spread of credit cards in the past few decades.[22]

A payment device related to the charge card is the *debit card*. Like charge cards, debit cards permit the cardholder to make a payment to a merchant through a third-party. The important differences between charge cards and debit cards are that: (1) in the case of debit cards, the payment of funds to the merchant comes from a specified deposit account and (2) that the cardholder takes no further action in order to debit the funds from the account. In other words, once a consumer initiates a debit card transaction, the consumer (generally) loses the ability to refuse to pay the funds; instead the funds are quickly debited from the deposit account. In the case of all charge cards, in contrast, the cardholder continues to have the practical ability not to make payment to the card-issuer.

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life." Oren Bar-Gill, *Seduction By Plastic*, 98 Nw. U. L. Rev. 1373, 1380 (2004). In our account, charge cards refer to any card that performs the first payment function (what Bar-Gill refers to as the transaction function), while credit cards are those charge cards that combine the payment function with the credit function (what Bar-Gill refers to as the borrowing function). As Professor Bar-Gill notes, the bundling of payment and credit functions explains many of the elements of the modern credit card industry. *See id.* at 1403.

Of course, we understand that the classic charge cards, such as the American Express green card, do involve the granting of short-term credit to the consumer. *See* Sujit Chakravorti, *Why Has Stored Value Not Caught On?*, Emerging Issues Series, Supervision and Regulation Department, Federal Reserve Bank of Chicago (May 2005), at 6, available at http://www.chicagofed.org/publications/publicpolicystudies/emergingissues/pdf/S&R-2000-6.pdf. Despite this fact, the credit granted by such cards is quite limited: the balance must be paid off at the end of the billing cycle. In the case of credit cards, the time period for repayment can be indefinite.

[21] For descriptions of the historical story, *see* Bar-Gill, *supra* note 20, at 1380-83; Mann, *Credit Card Policy*, at 6-9; MARGARET C. JASPER, CREDIT CARDS AND THE LAW 1-3 (2d ed. 2000); DAVID S. EVANS & RICHARD SCHMALENSEE, PAYING WITH PLASTIC 53-85 (2d ed. 2005).

Arguably, the first charge cards were retailer-specific cards, such as the oil-company cards that first appeared in the 1920s. JASPER, *supra*, at 1; Bar-Gill, *supra* note 20, at 1381. For our purposes, though, because we are focused on ways of making payments rather than means of obtaining credit, the more important innovation are the Diners Club, American Express, and Carte Blanche cards, because they were the first that created true national markets for the making of payments to multiple merchants.

[22] *See infra* text accompanying note XX.

Debit cards themselves are simply an extension of ATM cards, which were first introduced in the early 1970s.[23] The first use of such cards to make retail purchases was in 1976, but consumers did not begin to take advantage of the debit function in widespread fashion until the 1990s.[24] While most readers are familiar with the basic outlines of how such cards operate,[25] there are important differences between the two main types of debit cards. *Online debit card* transactions are processed through an ATM network, the same one that is used to obtain cash from an ATM machine.[26] Just like the ATM withdrawals with which we are all familiar, such transactions are usually initiated by swiping the debit card and then entering a personal identification number ("PIN").[27] *Offline debit cards* differ in that the transfer of funds is not accomplished through an ATM network, but instead through a credit card network, and generally requires only a signature, not the entry of a PIN. The Visa Check Card is an example of this sort of offline debit card.[28]

Stored value cards are products that have emerged over the last decade but have not yet gained wide acceptance. Such cards involve the transfer of funds from a funding source to an electronic recording device on the card. The sources of funds for such cards are quite heterogeneous: they can be funded by placing cash in a machine that then transfers the funds to the recording device, through the direct debit of funds from a deposit account, or even by a transaction charged to a credit card. Perhaps the most successful examples of such cards are the Metrocard used on the New York City subway and bus lines and the SmarTrip farecard used on the Washington, D.C. Metrobus and Metrorail systems. Both the SmarTrip card and the Metrocard are examples of closed-system cards, which means that they can (generally) only be used to make payments to

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[23] *See* FUMIKO HAYASHI ET AL., A GUIDE TO THE ATM AND DEBIT CARD INDUSTRIES 12 (2003), available at http://www.kc.frb.org/FRFS/ATMPaper.pdf.
[24] HAYASHI ET AL., *supra* note 23, at 14 & 41.
[25] For those who are not, the basic mechanic of a debit card is that it is an authorization by the payor to debit her checking or savings account a certain amount to make a payment to the payee. HAYASHI ET AL., *supra* note 23, at 5. The actual mechanics of how and when this occurs vary depending upon the network used, a topic we take up in the rest of the paragraph.
[26] *See* HAYASHI ET AL., *supra* note 23, at 44 (noting that all online debit networks are part of an ATM network).
[27] RONALD A. MANN, PAYMENT SYSTEMS AND OTHER FINANCIAL TRANSACTIONS: CASES, MATERIALS, AND TRANSACTIONS 144 (2d ed. 2003).
[28] HAYASHI ET AL., *supra* note 23, at 8.

the entity that has issued the card.[29] As we will discuss in more detail below, trials of open-system stored value cards in the United States have usually failed.

Often linked to stored value cards, but conceptually distinct, are so-called *smart cards*. This term is generally used to refer to any payment card that has a microchip embedded in the card that contains information. In Europe, one of the primary uses of smart card technology has been to allow the embedding of a PIN on a microchip located on a credit card, which the consumer confirms when she makes a purchase with the card.[30] The use of this anti-fraud technology has not caught on in the United States, perhaps because the telecommunications network is a cheaper and more reliable means of validating credit card purchases.[31] Instead, American companies have sought to use the improved security that comes from a smart card to make stored value cards more reliable.

Part II. Merchant and Consumer Preferences

With these key terms defined, this Part turns to a discussion of merchant and consumer decision-making. Understanding our central inquiry—*whether* and *how* the government should attempt to alter the choices that consumers make about payment systems—first requires an understanding of how consumers are likely to make such choices. The decision between payment systems occurs in two stages. In the first stage, the consumer must choose to adopt a payment system as an option, as must the merchant. In the second stage, the consumer must decide which of the available payment systems to use.[32]

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[29] Other examples of such closed-system payment cards include the stored value cards often issued by universities (including our own) and by the military. *See e.g.,* http://studentaffairs.shu.edu/campusid/piratesgold.html, last visited Nov. 16, 2005.

[30] *See* EVANS & SCHMALENSEE, *supra* note 21, at 7-8 & 300.

[31] EVANS & SCHMALENSEE, *supra* note 21, at 7-8; Carol L. Clark, *Shopping without Cash: The emergence of the e-purse*, ECONOMIC PERSPECTIVES (4th Quarter 2005), at 34, 36.

[32] There are exceptions to this general rule that the choice of the particular payment system will be in the hands of the consumer. For instance, as a matter of practice, it is merchants rather than consumers who have the choice on whether to convert a check to an ACH payment. (For an explanation of ACH payments, see RONALD MANN & JANE WINN, ELECTRONIC COMMERCE (2d ed. 2005). Formally, the consumer has been given notice of the merchant's intent to convert check payments to ACH payments and then implicitly consented to the conversion by failing to object. Nonetheless, the ultimate decision as to the use of ACH payments is left with the merchant.

A. Merchant Decision-Making

For ease of exposition, we start with the merchant's decision to accept a particular payment option. For a merchant, the question is whether accepting a payment option will maximize profits.[33] We hypothesize that the merchant will choose to adopt a payment system when it allows the merchant to maximize its return on its investment. In the context of payments, this means that the merchant's investment in a new payment system must exceed the return on other opportunities.

The profit, *P*, that a merchant will make from the adoption of any particular payment system, X, is a function of both the additional revenues that the system will generate, *AR*, and the costs of the new system, *C*:[34]

$$P(X) = AR - C\ .^{35} \qquad (1)$$

Costs of a payment system can be further subdivided into two types: start-up costs, *SC*, such as the initial fees to buy credit card processing terminals, and per transaction costs, *TC*,[36] such as the cost of a phone call by an employee to verify a credit card, which leads to the following profit function:

$$P(X) = AR - SC - TC. \qquad (2)$$

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[33] FISHER, DORNBUSHCH & SCHMALENSEE, ECONOMICS 129 (2d ed. 1988)

[34] For the moment, we lump together both start-up costs and per transaction costs, and we draw no distinctions between quantifiable and non-quantifiable costs.

[35] *See* HAL R. VARIAN, INTERMEDIATE ECONOMICS 315 (3d ed. 1993); *see also* Rochet & Tirole, *supra* note X, at 564 (noting the need to assume that new payment systems will attract new consumers).

Of course, in theory, the profits and costs ought to be discounted to present value. But because the start-up costs are likely small, and because the other costs and benefits are likely to be contemporaneous, we ignore this complication for now. For a similar description of the investment decisions of payment providers and processors, *see* Sujit Chakravorti & Emery Kobor, *Why Invest in Payment Innovations*, Emerging Payments Occasional Papers Series, Federal Reserve Bank of Chicago, No. 2003-1B, at 4 ("[M]any investments are made with a long-term view where the firms' expected net value of future earnings from the investment are greater than zero.").

[36] By "per transaction costs," we mean not just those costs that are charged on each particular transaction, but also those costs that are charged on a periodic basis, so long as the merchant continues to use the payment system, such as a monthly access fee. Many vendors of credit card payment systems have such fixed charges associated with the payment system. *See, e.g.,* https://www.paypal.com/cgi-bin/webscr?cmd=_display-pro-fees-outside (last visited May 11, 2006) (noting standard $20 monthly fee).

The merchant should adopt a particular new payment system over an alternative use, Y, when:

$$P(X) > P(Y). \quad (3)$$

Because we are discussing alternative uses of the same investments, we can assume for our present purposes that C(X) = C(Y). This means that a merchant should adopt a new payment system when the additional revenues from the new payment system will exceed the additional revenues that would have been generated by an alternative use of the investment:

$$AR(X) > AR(Y). \quad (4)$$

As an example, consider the case of a restaurant that has to choose between spending $100 on additional advertising or on adopting a credit card system, which will impose a 3% charge on credit card purchases.[37] Assume that the availability of credit cards will increase the restaurant's business by $1000 and that the alternative investment in advertising will generate $950 in business.[38] Finally, assume that the marginal cost of producing the additional food is zero. On this account, the restaurant should invest in the credit card system because the additional revenues from that system exceed the additional revenues from advertising, even after we account for the 3% fee paid to the credit card company.[39]

Of course, the quantity of both the start-up and per transaction costs will still matter to the merchant's decision on whether to adopt a payment system. That is because

[37] We will treat the 3% fee as a discount on revenue rather than as an additional cost because the merchant never expends the fee; it is just a reduction in the payments the merchant receives from the credit card company.

Note that in the real world, this percentage is too high, at least for a merchant dealing with transactions involving the presence of the actual credit card (known as "card-present" transactions). Ronald Mann estimates that the fees for "high-quality retail merchants" are typically 1.5 to 2%. Mann, *Credit Card Policy*, *supra* note 21, at 44.

[38] The claim here is just that for a *particular* merchant, adding a credit card option might increase sales, not that credit cards or any other payments system increases the number of total sales, which is a different question. *See* Edmund W. Kitch, *The Framing Hypothesis: Is It Supported By Credit Card Issuers Opposition to a Surcharge on a Cash Price?*, 6 J. L. ECON. & ORG. 217, 223 (1990).

[39] That is because AR(X) = $1000 - $30 = $970, which is obviously greater than $950.

the larger those costs, the greater the additional revenues have to be in order to justify an investment in a payment system. If the start-up cost for our restaurant to adopt the new system was $200, instead of $100, and if $200 in additional advertising would generate $1500 in additional revenue, then it would be quite clear that the restaurant should invest in advertisement rather than a payment system.

In the real world, however, we believe that for many merchants the start-up costs for a new payment system are relatively small, and that therefore the additional revenue that has to be generated is also relatively small. For instance, a merchant who elects to start accepting charge cards has to pay almost nothing to buy the technology.[40] Most of the costs for charge card acceptance consist of monthly maintenance and rental fees, which we categorize as per transaction costs.[41] Thus, for merchants interested in a new payment system, the question is really whether the additional revenues of the new payment system, minus the per transaction costs, exceed the alternative profits that could have been generated by those same costs.

There are two final caveats we should mention. First, in many cases, a new payment system will not increase revenues to the same extent that it might initially appear. Returning again to our restaurant example, while the restaurant may generate an additional $1000 in business, it may also be that all of its consumers begin paying using credit cards. If so, the actual amount of additional revenue is only $820, and the restaurant should instead spend the money on advertising, which would generate $950 in revenue.

Second, and more importantly, we need to emphasize that not all of the costs and (perhaps) not all of the "revenue" may be financial or even quantifiable. For example, one such potential non-financial cost is the hassle cost associated with adopting and using a payment system.[42] Merchants have to account for the time and effort that their

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[40] Professor Ronald Mann estimates that the equipment costs are at most a few hundred dollars. *See* Mann, *Credit Card Policy*, *supra* note 21, at 27.

[41] There are also, of course, the per-transaction fees, but as we noted above, *see supra* note XX, we view these as a discount on additional revenues, rather than as a cost.

[42] *See* Dan Ariely & Jose Silva, *The Macro-Effects of Micro-Pricing: Behavioral Effects of Payment Methods and the Effectiveness of Micro-Pricing*, Working Paper, Mar. 30, 2005 (noting the existence of hassle). Hassle costs, as we are using the term, are similar to, but not the same as switching costs. *See e.g.,* CARL SHAPIRO & HAL VARIAN, INFORMATION RULES 104 (1999). We are assuming here that investment in one payments system technology does not preclude investment in another such technology; therefore, no switch needs to be made.

employees have to spend learning a new payment system (a start-up hassle cost) and the time and effort they spend running a credit card through a reader and then printing out the receipt (a per transaction hassle cost). This investment of time and effort on the part of employees is a real cost to the merchants, because the employees could have been spent the time and effort on training to provide better service (in the case of the start-up cost) or on providing more timely delivery of another patron's meal to her table (in the case of the per transaction cost).

More speculatively, a merchant may adopt a payment system not just because of the revenues that will result, but because of the status that she thinks it will bring her; in other words, the restaurant might start accepting credit cards not because of the additional revenues, but because the owner wants to be seen as "high-end." This obviously requires a departure from the assumption of the merchant as a simple profit-maximizer, but we believe such a departure may be warranted for at least some subset of merchants.[43]

B. Consumer Decisions to Adopt a Payment System

Consumers' decisions about whether to adopt a payment system into their respective portfolios of options ought to be similar, but not identical, to that of merchants. One difference is that, unlike merchants, consumers may not view the start-up costs associated with the adoption of a payment system as trivial, particularly when they are unfamiliar with it. Consider E-ZPass, a form of stored value card used on highways in the Northeast and the Midwest. In the E-ZPass system, a customer sets up an account with an E-ZPass member organization. Customers usually fund and periodically refill the account with a credit card, although some customers use cash or checks. Assuming that the account has money, the customer may pay her tolls on any E-ZPass participating highway by an automatic signal from a radio frequency identification ("RFID") transponder. Adopting E-ZPass involves a good deal of hassle start-up costs: the

[43] At least one commentator suggested to us that a merchant may need to offer a credit card option, not to increase revenues, but to maintain revenues when competitors start to accept credit cards. We believe that this is a distinction without a difference. At any given time, the question for the restaurant is whether the additional revenues from adding a credit card option, *discounted to present value*, exceed the discounted additional revenues that would be generated from an alternative investment. When a merchant offers a credit card payment option to stave off defections by customers, this is additional revenue, because without the credit card option, there would be lower revenues in the future.

customer must fill out an application, mail it in or submit it on-line, receive back the RFID transponder, and then attach the transponder to the car.[44] Furthermore, if the customer does not use a credit card, the funding of the E-ZPass account with cash or checks can involve some additional hassle per transaction costs.[45]

Just as a merchant seeks to maximize profits in its investment decisions, a consumer seek to maximize their expected utility, which is a function of the benefits and costs of any particular decision she makes:

$$EU(A) = B(A) - C(A) \qquad (5)$$

The expected utility of an alternative choice is also a function of that choice's benefits and costs:

$$EU(B) = B(B) - C(B) \qquad (6)$$

Assuming that A and B are alternative payment systems, a consumer should pick the new system, B, when the expected utility of that system exceeds the expected utility of the old system, A, such that:

$$EU(B) - EU(A) > 0, \qquad (7)$$

Or

$$B(B) - C(B) - (B(A) - C(A)) > 0 \qquad (8)$$

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[44] *See* http://www.ezpassnj.com/static/signup/ind_plans.shtml. (last visited Sept. 5, 2006).

[45] For consumers who pay by check, they must replenish the account by sending in a check in a timely fashion. For those consumers who have neither a credit card nor a checking account, they must make these payments either by money order (which necessitates obtaining the money order) or in cash at an E-ZPass facility (which is usually relatively inaccessible). For instance, in the state of New Jersey, there are only three E-ZPass service centers, and the state of New York has only eight, although for reasons we cannot fathom, there are actually two in and around Buffalo. See http://www.ezpassnj.com/static/info/csc.shtml (last visited Sept. 5, 2006); http://www.e-zpassny.com/static/info/csc.shtml (same).

As we saw in Equation 2 in the previous section, costs for payments systems consist of both the start-up costs and the per transaction costs:

$$C = SC + TC \qquad (9)$$

Furthermore, consumers need not adopt a new payment system for *all* transactions; a consumer can choose to obtain a credit card, but still pay for most transactions with cash or check. Therefore, what really matters to a consumer is whether there is some subset of transactions, *i*, for which Equation (8) is true:

$$B_i(B) > B_i(A) + SC(B) + TC_i(B) - TC_i(A)^{46} \qquad (10)$$

Unlike benefits and per transaction costs, we do not limit start-up costs to those for *i* transactions, on the theory that the start-up costs are the same regardless of the size of the subset of transactions. For instance, the costs of obtaining a debit card are the same regardless of whether the consumer will use it only to get cash from an ATM or will use it for all of her purchases. In addition, we ignore the start-up costs associated with the pre-existing payment option, because those costs are sunk. However, as we will note below, in some circumstances sunk costs may play a role in decision-making about payment systems.

As an example, consider a consumer's decision to obtain a new credit card. As with the E-ZPass example above, there will be some start-up hassle costs in obtaining the card, and perhaps even a small fee associated with the card. The real question for the consumer, given these start-up costs, is whether there is a set of transactions for which

[46] Professors Jean-Charles Rochet and Jean Tirole hypothesize that a customer should purchase a payment card only if the expected benefit exceeds the expected fee. *See* Jean-Charles Rochet & Jean Tirole, *Cooperation Among Competitors: Some Economics of Payment Card Associations*, 33 RAND J. Econ. 549, 553(2002). Our analysis here is similar, but with some modifications. First, we make clear the distinction between start-up costs for a system and per transaction costs, and we assume that the costs that really drive decision-making by consumers are not financial, but rather temporal and psychic. (Rochet and Tirole describe the fee as the "customer's yearly fee," *id.* at 553, and not as a per actual transaction fee, suggesting it is just meant to cover up-front fees). Second, our version recognizes that the benefit available to the consumer is limited to those circumstances where the benefits of a particular payment system are greater than those of other systems. In other words, the benefit that Rochet and Tirole identify can only be calculated as a net against the existing benefits from other payment systems.

the consumer's additional benefits from having the card exceed the additional costs of having the card:

$$B_i(B) - TC_i(B) - B_i(A) + TC_i(A) > SC(B)^{47} \qquad (11)$$

Assume that in the past, the consumer has paid for her gasoline purchases using cash, but that her service station's owner, who we will call Gas Co., is offering her a credit card with which to purchase gasoline in the future. We will assume that the consumer receives no benefit from using cash and that the costs of obtaining cash are quite low. Furthermore, there are no actual financial costs for using cash (because she has ready access to her bank's ATMs, which charge her no fees) and that the marginal hassle cost of getting cash for such transactions is quite low: say the discounted present value of such costs is $100. Filling out the application and obtaining the card from Gas Co. involves no financial fee, but let us assume that there is a real hassle cost involved, and that this can be quantified as the equivalent of $50. Furthermore, we will assume that Gas Co. offers her no benefit from the use of the card, although the transaction costs are reduced to $75.[48] On this account, the consumer ought to decline the card, because it results in an expected net decrease in her utility: $SC(B) = \$50$, while $B_i(B) - TC_i(B) - B_i(A) + TC_i(A) = \$25$.

To remedy this problem, Gas Co. might introduce a rebate program that gives the consumer 5% cash back on all purchases made with the Gas Co. card over a calendar year. If the discounted present value of that rebate is, say, $50, now the consumer should

[47] Admittedly, in theory we need to account for the lost opportunity cost on alternative investments of the start-up costs, as we did in Part II.A. We do not do so here because we believe that such costs are generally quite low. First, the lost opportunity cost for the investment of "hassle" just is, we believe, the hassle cost. For example, when a consumer fills out a credit card application, the hassle cost just is the lost opportunity of watching ESPN or E! Channel reruns, or some similar activity Of course, the consumer perhaps *ought* to have put that time to better use, but probably would not have. Thus, for nonquantifiable costs, the concept of hassle at least incorporates the lost opportunity cost. Second, for quantifiable costs, there is obviously a real lost opportunity cost that we are not considering; however, because we assume that these quantifiable start-up costs tend to be quite low (such as the cost of a postage stamp on the return of a credit card application), we cheat and ignore this problem.

[48] Even assuming that the consumer can be sure that she will never pay credit fees for running a revolving balance on the card, she still has the hassle of making monthly payments to Gas Co. and any financial fees involved in make such payments, such as the purchase of additional checks, etc.

adopt the card, because the start-up costs ($50) are outweighed by the net gain on the other side of Equation 11: $75.

One difficulty with consumer decisions about payment systems is that many of the costs are nonquantifiable costs, such as hassle costs, and that consumers will tend to be quite heterogeneous in how they value these costs. Return again to our Gas Co. example. We hypothesized that the consumer faced lower transaction costs for a credit transaction than for a cash transaction. If such costs are limited to hassle costs, this may strike most readers as intuitively correct, because they pump their own gas and can pay with a credit card right at the pump, whereas cash payments may require going into an office, and may even require pre-payment. The assumption does not strike us as intuitively correct, however, because we both live in New Jersey, where we cannot pump our own gas, and payments with cash are both quicker and generally friendlier (particularly in winter, gas station attendants do not relish trudging back and forth with credit cards while we sign). A New Jersey consumer, therefore, may need a greater benefit to adopt the Gas Co. card than a consumer across the river in New York. Furthermore, the willingness of New Jersey consumers to adopt the card will vary with how much they disvalue the cost of paying with credit; some of us are simply less sensitive, both to the time loss and the unfriendliness of the attendants.

Another problem is that the nonquantifiable costs are, we believe, quite diverse. So far we have focused on the hassle of engaging in any particular transaction, but there are other potential costs. For instance, consumers might be concerned not just with the hassle of using a credit card, but with the potential loss of privacy as well. One "benefit" of cash transactions is that they generally leave no record, whereas credit card payments can generate a paper trail of exactly where a consumer has spent her money. For instance, if one wants to hide certain transactions from a spouse, this is a powerful reason to pay cash rather than credit.[49]

In addition, there is a risk of theft, both of money and of identity. When a consumer adopts cash as a payment system, she obviously takes on the risk that she will

[49] This remains true even in an age when cash transactions, to the extent they involve an ATM withdrawal, generate some form of record. It is a lot safer to pay $1000 for jewelry for your mistress using cash rather than using the credit card at Tiffany's. Somewhat plausible stories for the $1000 withdrawal are easier to generate than stories about who received the jewelry, not that either of us would know about this!

be robbed at some point and lose the cash in her possession. The risk of this type of theft is lower with the adoption of a credit card or even a debit card system: in both cases, a consumer's liability for unauthorized transactions is capped both by statute and by card company practice. However, adoption of credit cards and debit cards may open up consumers to the possibility of identify theft, which can impose both financial and non-financial costs.

There is also the problem of sunk costs. As Professor Richard Thaler has noted, "only incremental costs and benefits *should* affect decisionmaking."[50] But in reality, historical costs appear to affect the decisions that consumers make in the future. Consider again the consumer who has gone through the hassle of setting up an E-ZPass account and obtaining the RFID transponder. Once the consumer has E-ZPass, the hassle becomes a sunk cost that the consumer ought to ignore (as a normative matter) in making decisions about how she will pay for particular tolls.[51] Indeed, the consumer will inevitably encounter situations where the cash alternative is superior to E-ZPass, such as when the driver has coins readily available and the E-ZPass lines are *longer* than the others.[52] But because ours is a positive model, we assume, in accord with the experimental evidence, that such sunk costs do affect consumer decisions about payment systems, such that previous costs incurred to obtain access to a payment system will make the consumer more likely to use the system.[53] For instance, consumers who have paid for access to a charge card may be more willing to use that card in the future than they otherwise would be.[54]

The benefits to consumers from various payment services can also be nonquantifiable and quite diverse. As we have already suggested, the most obvious examples of financial benefits to adopting a payment system are reward or affinity

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[50] Richard Thaler, *Toward a Positive Theory of Consumer Choice*, J. ECON. BEHAV. & ORG. 39, 47 (1980).
[51] *See id.*
[52] On some roads, such as the Garden State Parkway, not all toll lanes accept E-ZPass.
[53] *See* Thaler, *supra* note 50.
[54] There are other transaction costs that may appear to be sunk costs but are not. For example, say that a consumer is deciding whether or not to pay in cash or write a check for a purchase. In order to write a check, the consumer would have first had to decide to purchase checks, which will necessarily have cost the consumer money. Although this prior purchase of checks might be seen as a sunk cost, it is not. The consumer will correctly intuit that writing a check brings her closer to having to buy more checks: the price of a check is properly a cost of writing one. This is actually (in our terminology) a per transaction cost for the consumer. *See supra* notes 36-37 and accompanying text.

systems: either a small rebate on the purchase, or credit toward a reward (such as a free airline ticket).[55] As for non-financial benefits, a consumer might value the ability of the payment system to generate a record of the transaction (the flip-side of our privacy cost point above). Prestige or social standing is another potential benefit of some payment systems. For instance, some people may pay with a "platinum" credit card instead of another credit card, not because the rate is cheaper or the hassle lower, but simply to gain the prestige that they believe is associated with having and using the card.[56] In other contexts, some consumers may wish to use a payment system to indicate that they are "tech-savvy." For instance, when the New York City Transit Authority introduced the Metrocard, it believed that earlier users would be just such individuals.[57] Of course, consumers may have completely idiosyncratic reasons for liking the older payment form. Think, for instance, of the 40-year-old who still eats Kraft Macaroni and Cheese. We[58] can be fairly certain that, if he was tasting it for the first time, he would choose something else, but the whole point is that it is not his first taste. As with food, familiarity and tradition may provide much of a payment system's appeal. For example, checks have proven remarkably persistent despite the many electronic alternatives, particularly for payment from remote locations. The most common explanation for this persistence is that individuals are simply wedded to tradition.[59] The comfort that comes from maintaining the tradition weighs in any decision toward maintaining the status quo.

Finally, because ours is a positive model, we focus in both this section and the next section on how consumers *actually perceive* the costs and benefits we are describing, not on the "real value" of these costs and benefits, even when they are easily quantifiable. For example, to the extent that consumers fail to account for some real

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[55] Mann, *Credit Card Policy*, *supra* note 21, at 43-44.

[56] *See, e.g.*, Kirk Johnson, *Pending in Guilded Style*, N.Y. TIMES, June 26, 1983, at § 3, p. 12; Carole Goul, *Personal Finance: In Credit Cards, All that Glitters*, N.Y. TIMES, Feb. 2, 1986, at § 3, p.9; Jane Wolfe, *Vicarious Consumption: Beyond the Glow of Platinum*, Dec. 5, 1999, § 3, p. 10.

What may really matter is having, as opposed to using, the card. But because possession of the card may be hard to signal without use, consumers use the cards to signal possession, which then signals social standing.

[57] *See* Matthew L. Wald, *Fare Card Plan in the Subways Exceeds Goals*, N.Y. TIMES, Feb. 20, 1994, at 39 (noting that it was unclear if such people had actually adopted the Metrocard).

[58] Or at least Waldeck.

[59] Sujit Chakravoti & Carrie Jankowski, *Forces shaping the payments environment: A summary of the Chicago Fed's 2005 Payments Conference*, Chicago Fed Letter No. 219, at 2 (Oct. 2005).

costs—for instance, they may not take into account the full costs of using a credit card—we accordingly discount them.[60]

C. Consumer Decisions to Use a Payment System

This brings us to the second-stage decision: the consumer's choice among payment systems for a particular transaction. Our basic postulate is that a consumer will pick payment system B (say, a credit card) over payment system A (say, cash) for a particular transaction, *j*, when the expected utility for using the credit card exceeds the expected utility of using cash:

$$EU_j(B) > EU_j(A).^{61} \qquad (12)$$

In these expected utility functions, consumers weigh the benefits and per transaction costs of the competing payment options, because the start-up costs for both systems are now sunk, such that B should be selected over A where:

$$B_j(B) - TC_j(B) > B_j(A) - TC_j(A) \qquad (13)$$

The other main important conceptual difference between Equation 11 and Equation 13 is that, here, the consumer is selecting a payment system not on the anticipated benefits and costs for a hypothetical set of transactions, but instead for a particular transaction. In other words, at this stage the consumer (generally) will have better information about the actual value of the costs and benefits of a particular payment system.

As an example, return to a consumer's choice to adopt the card from Gas Co. and now assume that our consumer lives in New York and works in New Jersey. In making the decision as to whether to adopt the credit card, she faces uncertainty as to where she is going to make her gasoline purchases. On the one hand, if she makes all of them in

[60] *See generally* Bar-Gill, *supra* note 20, at 1395-1408 (giving a positive account of consumer choice within the credit card market).
[61] *See also* Wilko Bolt & Alexander F. Tieman, *Skewed Pricing in Two-Sided Markets: An IO Approach*, DNB Research Papers (Oct. 2004), at 5-6, available at http://ideas.repec.org/p/dnb/dnbwpp/013.html.

New York (where again she pumps her own gas), it makes sense to get the card, because the transaction costs for credit are less than the transaction costs for cash. On the other hand, if she makes all of her gasoline purchases in New Jersey, where we hypothesize that the transaction costs of credit outweigh the transaction costs of cash, then she should not adopt the card. For the consumer in this situation, what drives the decision about adoption is information about the likelihood of gasoline purchases in New York or New Jersey.

At the point of the decision to *use* the card, however, this uncertainty is obviously removed. If she is purchasing gasoline in New York, it makes sense to use the card, because the marginal benefits of using credit over cash likely outweigh the marginal transaction costs.[62] If she is instead purchasing gasoline in New Jersey, the marginal costs of using the card may outweigh the benefits, so the consumer will not choose to use the card. The point is that at the time of the actual decision to *use*, the uncertainty has been removed.

D. Network Effects and Multi-Sided Platforms

Up to this point, we have modeled the choices of consumers and merchants based upon an implicit assumption that the benefits and costs to the parties are independent of the choices made by other parties. But that assumption is clearly wrong. Payment systems are subject to *network effects*: the benefits to both consumers and merchants of adopting a new payment system turn, in large part, on the willingness of other market participants to adopt or use that payment system.[63] Consider again Equations 4 and 11. The decision by a merchant to invest in a new payment system (Equation 4) depends directly upon the additional revenue to be generated by the system. For there to be additional revenue, there must be consumers who have both adopted the new system and who will use it if the merchants offer it. If no potential customers of our hypothetical restaurant have adopted the credit card, nor are likely to do so, then the restaurant is

[62] This may not always be true, even in New York. The marginal benefits of use of the card, if they are limited to the rebate, are likely to be constant. The marginal transaction costs could, however, vary.
[63] Of course, the decision to *use* the payment system is *not* dependent in this way upon the willingness of merchant's to adopt the system: the ability to make a decision about use depends in the first instance upon the merchant's decision to have adopted that payment system.

unlikely to see any additional revenue, and it is fairly certain that an alternative investment would make sense.

A consumer's decision to adopt a payment system (Equation 11) is similarly dependent upon merchant adoption of the system. Recall that the following condition must be fulfilled for a consumer to adopt a payment system:

$$B_i(B) - TC_i(B) - B_i(A) + TC_i(A) > SC(B) \qquad (11)$$

The greater the number of transactions in which new system B can be used, the more likely it is that we can identify some subset of such transactions for which Equation 11 will be true. For instance, we suggested in our Gas Co. example that the use of a 5% rebate might be enough to get a consumer to adopt the card, depending upon the hassle costs, and we also hypothesized a scenario in which use of the card in New York made sense, but not in New Jersey. However, if not all Gas Co. stations take the card, or she also buys gasoline at the stations of other companies that do not accept the card, then her benefit from using the card will be lower, and perhaps insufficient to overcome the start-up costs of adopting the card. On the other hand, if she can use the card not just to make gasoline purchases at Gas Co., but food purchases at Fast Food Co., then her benefits from the card may be even greater, making adoption of the card that much more likely. The point is that merchant decisions to adopt a payment system increase the set of possible transactions in which the conditions of Equation 11 for consumer adoption will be met.

Not only are payment systems subject to network effects, but they are also *multi-sided platforms*. David Evans and Richard Schmalensee define such markets as having three basic characteristics: (1) there are at least two distinct types of customers for the product; (2) there is some benefit to be obtained from coordinating members of the groups; and (3) there is an intermediary that, through coordination, can make the members of the groups better off.[64] Examples of such multi-sided platform networks include operating systems (which make both software developers and computer users better off), television stations (which make both advertisers and viewers better off), and

[64] EVANS & SCHMALENSEE, *supra* note 21, at 134-35.

payment systems (which have the potential to make both consumers and merchants better off).[65] Because they are multi-sided platforms, the benefits to a party of the network do *not* depend upon the number of similar parties that are on the network, but instead upon the number of parties there are on the *other side of the platform*. For instance, a video game user traditionally did not care how many other players use a particular gaming system; what she really cared about is how many video games are developed for the system.[66] Of course, sometimes the existence of other users on the same side of the platform will be an additional benefit to a network, but the key to any such network is having enough users on both sides of the platform. For instance, if your colleagues are watching your favorite television show, water cooler talk might enhance your enjoyment of it. But regardless of how much viewers enjoy a show, it will be cancelled unless sufficient numbers of advertisers are interested in the program.[67]

A multi-sided platform network presents the very difficult *chicken-or-the-egg problem*:[68] unless both sides of the transaction can be convinced that they are better off with the new payment system, it will not be adopted. And the presence of network effects means that the willingness of, say, consumers to adopt the new system will depend on merchants also adopting it. The result, as commentators have noted, is that "[t]o gain critical mass in the marketplace, payment providers have to convince simultaneously a large number of participants of the benefits of new payment mechanisms."[69] Thus, the consumers and merchants whose behavior we model above are not isolated from each other; rather, a merchant considering whether to adopt a new payment form considers whether consumers are likely to adopt the same form, and vice versa.

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[65] EVANS & SCHMALENSEE, *supra* note 21, at 136-38.
[66] This may be less true now, as more gaming systems have remote multi-player games.
[67] As a recent example, consider the demise of the CBS show, Joan of Arcadia. While the show was plagued by declining ratings, the real factor leading to cancellation in 2005 seems to have been the age of its average viewer: 53.9. *See Fans demand 'Joan', fight CBS over cancellation*, USA Today, May 30, 2005, available at http://www.usatoday.com/life/2005-05-30-joan-arcadia-fans-petition_x.htm. That number made the show very unattractive to advertisers, who prefer younger viewers.
[68] This exists whenever payors and payees must adopt a new technology simultaneously for it to be successful, "otherwise there is little incentive for consumers or merchants to embrace the new instrument." Chakravorti & Kobor, *supra* note X, at 7 n.12; *see* EVANS & SCHMALENSEE, *supra* note 21, at xiii.
[69] Sujit Chakravorti & Carrie Jankowski, *Forces Shaping the Payments Environment: A Summary of the Chicago Fed's 2005 Payments Conference,* 219a Chicago Fed Letter (October 2005), available at http://www.chicagofed.org/publications/fedletter/cfloctober2005_219a.pdf.

E. The Difficulty of Achieving a Critical Mass

The rub, however, is that consumers and merchants are unlikely to be easily convinced that they have the same interest in adopting (and using) a new payment system. As Equations 4 and 11 illustrate, the conditions under which consumers and merchants are likely to adopt a payment system are different. We predict that a merchant will adopt a payment system whenever the additional revenues gained from adoption of the system outweigh the additional revenues that could be generated from another investment of those resources. For their part, consumers will adopt a new payment system only where the start-up costs for adopting the system are outweighed by the increase in net benefits and costs from moving to the new system for some set of transactions.

Not every new payment system, though, will satisfy *both* Equations 4 and 11. As an example, recall the introduction of stored value cards on the Upper West Side, where Equation 4 for merchants appears to have been satisfied, but not Equation 11 for consumers. Here, merchants appear to have had quite limited start-up costs, which suggests that the additional revenues from the cards need not have been great for merchants to be willing to offer them. Furthermore, to the extent some consumers converted from cash to the use of the stored value cards, merchants presumably would have seen additional revenues in the form of a reduced risk of theft of the funds by robbers or employees.

For consumers, however, it does not appear that Equation 4 was satisfied. The stored value cards in this experiment were distributed as microchip-based smart cards placed onto debit cards, which were then sent by the banks involved to their customers who lived on the Upper West Side. In the existing payments universe at the time, stored value cards competed with cash and (to a lesser degree) debit cards.[70] It is hard to see *any* set of transactions in which the stored value card was better than either cash or a debit card. Consumers had to load the stored value card at an ATM, so the card involved

[70] The experiment was initiated in 1997. At the time, debit cards were a fast-growing subset of payments, but still a fraction of what they are today. *See* HAYASHI ET AL., *surpa* note 21, at 41-43.

just as much hassle as getting cash, and had no lowered costs or added benefits. Indeed, the cards were not safer than cash because, assuming a consumer was robbed of her cash, her cards were likely to be taken as well, and the stored value would be lost.[71] Stored value cards also did not improve the consumer's position as compared to debit cards, because both could be used for the same kind of transaction, and presumably most merchants who were wired to accept stored value cards would also accept debit cards. In addition, debit cards, which required the use of a PIN, had additional security. The "cash back" feature of debit cards also allowed greater access to funds. In sum, no set of transactions existed for which consumers would prefer stored value cards. Thus, even if the start-up costs associated with the cards were quite low, consumers simply had no incentives to adopt them.

Despite the absence of benefits to one side of the transaction, a new payment system can still thrive if the payment platform provider can internalize both some of the gains of one party and the costs of the other party, and thereby make adoption of the system more likely. One way to do this is for the platform provider to give a benefit to one side of the platform to stimulate adoption. For instance, in our Gas Co. example, we imagined the consumer being given a 5% rebate as a way of encouraging adoption. In the real world, similar examples exist. For instance, while general use stored value cards have not succeeded in the market, proprietary stored value cards have had more success. In such transactions, the merchant and the platform are the same entity (as they are in our Gas Co. example), and therefore the merchant/platform can internalize the costs to the consumers by directly offering other benefits to the consumer to entice use of the card. For instance, Starbucks has heavily promoted its Starbucks Card, which is a stored value card that consumers can use to make purchases in the store. Between October and the end of December 2005, consumers placed more than 35% more value on Starbucks Cards

[71]Professor Leo van Hove suggests that stored value cards may be better for consumers than cash, because they do not have to worry about exact change, transaction time is similar, they do not have to carry a bulky wallet or purse containing bills and coins, and they may be able to reload the device at home, removing the need to go to a phone. Leo van Hove, *Electronic Purses in Euroland: Why Do Penetration and Usage Rates Differ?*, SUERF working papers (on file with author) (manuscript at 11-12. All of these benefits (except the last one), applied to the New York trial. Professor van Hove's analysis (which was not aimed at the New York trial) ignores that, at least for an initial adopter, some of these benefits did not exist because not all merchants accepted the cards. Furthermore, to the extent cash had been downloaded to the card, it then became unavailable to use to pay cash-only merchants.

than they had a year earlier.[72] At first, such increased usage is perplexing, given that consumers can use cash or offline debit cards at most Starbucks locations. However, a large portion of the loaded value in the quarter represents money placed on gift cards: almost 75% of the value placed on the cards occurred in one of the three months– December.[73] The question, of course, is whether individuals who received the gift cards will reload them with their own funds. To this end, Starbucks has taken another initiative to get consumers to use the Starbucks Card: it has tied the Starbucks card to a credit card, the Duetto card. At the end of each month, the consumer automatically receives a reward in the amount of 1% of the purchases made on the Duetto credit card over that month.

Another complication for initiating a new payment platform is the fact we noted in Part II.B: the benefits from the use of a payment system are more varied and they include potentially substantial non-financial benefits to a particular system. Furthermore, some of these benefits may tend to lock a consumer into an existing payment system in a way that merchants are not locked in. In the Starbucks example we just used, some consumers may tend to continue using a store-branded stored value card out of loyalty: being seen by others as a regular Starbucks consumer may bring them some value. For many other consumers, though, there will be no such value to possession of the Starbucks card, and this consideration will play no role in their decision to use (or more likely not use) the card.

This heterogeneity in the value of payment systems to consumers is a problem in gaining acceptance of the systems. Many of the benefits offered by service providers to entice one set of consumers to use a particular payment system will have no value to most other users. As a result, even if payment providers succeed in attracting a small number of consumers to the new payment mechanism, they will not obtain a critical mass.

The history of charge and credit cards provides an example of this phenomenon. Charge cards, particularly the American Express card, experienced substantial growth through the 1950s, 60s and 70s. The overall penetration of charge cards nonetheless remained quite low by our present standards: by 1977, American Express (which was by

[72] *See* Starbucks Coffee Company Fiscal 2006 First Quarter Financial Results Prepared Remarks, Remarks of Michael Casey, February 1, 2006, at 17.
[73] *Id.*

this time the dominant pure charge card) had "merely" 8 million cardholders.[74] Indeed, the peak penetration of charge cards into American households occurred in 1989, when 13% of Americans had such cards.[75] The difficulty for charge cards was and is that their benefits as a payment system are limited.[76]

Credit cards, by comparison, have experienced far greater market penetration. In 1970, the percentage of American households holding a credit card was only 16%—roughly the same percentage at which charge cards reached their peak.[77] By 2001, the market penetration of credit cards had exploded to almost 73%.[78] Credit cards have done so much better than charge cards over the last thirty-five years because they offer a wider range of benefits to consumers, leading to wider acceptance of the cards by merchants, which in turn has led to even more use by consumers.

What differences between charge cards and credit cards led to these wildly divergent outcomes? The most important is the ability of credit cards to extend a revolving line of credit to consumers. This is, in itself, a benefit that may often lead consumers to use a credit card over other options. Furthermore, changes in both technology and the law made it easier to offer revolving credit to consumers in the 1970s and 1980s. With the rise of computer technology and information processing, credit card issuers were better able to identify consumers who would be both interested in adopting a card and profitable for the payment provider. Furthermore, after the Supreme Court decided that local usury laws would generally not restrict the interest rates charged by credit card companies,[79] it became profitable to lend to consumers who had previously been deemed too risky.[80] The increased profits available from lines of credit then allowed credit card issuers to draw in other consumers through reward and affinity

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[74] EVANS & SCHMALENSEE, *supra* note 21, at 67.
[75] *Id.*, at 89.
[76] Of course, we are not trying to suggest here that charge cards have been a failure. Charge cards continue to be an important part of the electronic payments universe. Our point is simply that, compared to credit cards – indeed, even compared to debit cards – charge cards have been relatively unsuccessful. This lack of success is particularly noteworthy given that charge cards existed before credit cards.
[77] EVANS & SCHMALENSEE, *supra* note 21, at 89.
[78] *Id.*at 89.
[79] Marquette Nat'l Bank of Minneapolis v. First Omaha Service Corp., 439 US 299 (1978).
[80] The actual holding in *Marquette National Bank* was that a "national bank" was only restricted by the usury laws of the state in which it was located, not by the laws of the state in which its customer was located. 439 U.S. at 301. The practical effect of the decision, though, was that most large banks legally resided in jurisdictions such as South Dakota and Delaware in which there were no caps on interest rates. *See* EVANS & SCHMALENSEE, *supra* note 21,at 69-70.

programs. The net result was a wide range of benefits that allowed credit cards to vastly increase their market share.[81]

The importance of satisfying the heterogeneous interests of potential users raises a broader point about efficiency. As we have previously discussed, payment systems have financial costs for merchants and consumers. Often, an emerging payment system will hold the promise of net financial gains for users on both sides of the platform. But if the payment provider does not find a means of satisfying or overriding the disparate interests of potential users, the system will not be widely adopted. Because emerging payment forms often have lower service costs than their pre-existing competitors, improvements in payment systems can create clear economic benefits. But the market, left to itself, will not always adopt the most efficient system. That is, the payment system with the lower service cost may not be able to obtain a critical mass of users, at least not in the absence of government intervention.

Part III. Governmental Roles

Our central inquiry is whether and how the government can influence public preferences about payment systems, so as to increase the likelihood of success for a particular payment form. In the context of payments, government assumes multiple roles: fiduciary, seller, and law-maker. What government can and should do depends in part on the role that it has assumed. In this Part, then, we briefly examine the government in each of these roles.

As fiduciary, the federal government has two closely related goals: (1) to ensure that payees will accept coins and currency, and (2) to increase the demand for coins and currency by encouraging consumers to use new forms. These goals are intimately

[81] The same basic logic applies to merchants, of course. But because we assume that merchants, as a whole, are more driven by pure financial concerns in picking payments systems than consumers are, we assume that they are *less* heterogeneous than consumers. Having said that, there are certainly circumstances in which the benefits of a particular payment system are insufficiently attractive to particular merchants that at least one subset of merchants refuses to adopt the new payment system. Indeed, a recent example of this was the long reluctance of Waffle House restaurants to accept credit cards. Sue Stock, *Waffle House Caters to the Cash-Free*, The News & Observer (Raleigh, North Carolina), Feb. 21, 2006 at C11. For Waffle House, the reluctance to allow credit cards had been designed to keep costs (and thus prices) down. *Id.* Had enough merchants followed Waffle House's lead over the last thirty years, there is no chance that credit cards would have succeeded in the fashion they have.

connected because if payees refuse particular coins and currency, then payors are unlikely to use them. For instance, the Treasury Department introduced new colors on the $20 bill in 2003, the $50 bill in 2004, and on the $10 bill in 2006. Between 1996 and 2000, the Treasury introduced updated versions of the $5, $10, $20, $50, and $100 bills.[82] In support of many of these changes, the Treasury Department undertook substantial advertising campaigns to ensure both payee acceptance and payor use of the new bills. Less successfully, the Treasury Department has also attempted to gain support for dollar coins on several occasions.[83]

While "fiduciary" is probably the government's most well-known role with regard to payments, it is increasingly common for government to act as seller; that is, for the government to design a payment system for a service it purveys. Governmental agencies have long created payment systems for the collection of fares connected with both public and private transportation; in particular, they have encouraged and in some cases even required the use of tokens to pay fares both on toll roads and on buses and trains.[84] In the electronic age, governmental agencies have put strong pressure on riders and drivers to cease paying fares and tolls in cash and instead to adopt new, electronic forms of payment. For instance, drivers all along the East Coast have been encouraged to adopt E-ZPass by the liberal use of discounts in tolls.[85] Similarly, when the New York City Transportation Authority first introduced Metrocards, discounts were considered essential to obtaining consumer acceptance of the cards.[86]

In its third role as law-maker, the government attempts to influence consumer choices in situations where it is neither the seller of services nor the fiduciary of the payment system. Instead, the government provides laws or regulations that work to

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[82] See Website of Bureau of Engraving and Printing; http://www.moneyfactory.gov/newmoney/main.cfm/currency/history (last visited Sept. 5, 2006).
[83] John P. Caskey & Simon St. Laurent, *The Susan B. Anthony Dollar and the Theory of Coin/Note Substitutions*, 26 JOURNAL OF MONEY, CREDIT AND BANKING 495 (1994).
[84] *See, e.g., Nemser*, *supra* (noting NYCTA's requirement that fares be paid using tokens).
[85] Joe Malinconic, *Will it Be E-ZCome, E-Z Go?*, THE STAR-LEDGER (NEWARK, NJ), Nov. 29, 2004, at 13; Joe Malinconico, *Turnpike Targeting E-ZPass Discount*, THE STAR-LEDGER (NEWARK, NJ), Nov. 11, 2004, at 19 (noting discounts given in New York and New Jersey). Similar tactics have been used in Illinois to get drivers there to adopt the similar I-Pass. *See* Gene Amromin et al., *Inducing more efficient payment on the Illinois Tollway*, Chicago Fed Letter (Apr. 2006).
[86] Richard Perez-Pena, *Transit Agency Plans Its First Volume Discounts*, THE NEW YORK TIMES, Oct. 26, 1996, at A1; James C. McKinley, Jr., *Despite Big Push, New Yorkers Snub Transit Card*, THE NEW YORK TIMES, Aug. 17, 1994, at A1; Douglas Martin, *Fare Cards: A Glimpse of the Future Underground*, THE NEW YORK TIMES, Jan. 7, 1994, at B3.

improve the social acceptance of a particular payment system. Check 21, enacted in 2003 and discussed in the Introduction, is the most recent example of this sort of governmental action.[87]

When the government acts as law-maker, it may have little direct interest in the underlying payment system.[88] For instance, the government has only a small financial interest in the existence of a robust check collection system, and therefore little direct interest in whether substitute checks succeed or fail.[89] When the government acts as seller, it obviously has a much larger financial stake in the success of enterprises such as Metrocard and E-ZPass. Similarly, the government's interest in the checking system is qualitatively different than its interest in payment systems when it acts a fiduciary: the acceptance of substitute checks does not appear to be vital to the continued functioning of the economy in the way that the acceptance of United States currency is.

The government does, of course, have a general interest in payment systems. After all, as we noted in the previous Part, some payment systems are more efficient than others. Efficiency is generally good for society, so the government has reason to promote it.[90] The government, however, also has an interest in being responsive to the other subjective preferences of consumers (and perhaps even merchants). After all, efficiency is not (nor should it be) the only criterion by which to judge governmental action. Indeed, as we discuss later,[91] politicians who disregard subjective preferences may pay a heavy price at the ballot box. But in the next Part, we assume that the government has a legitimate interest in changing endogenous preferences about payment systems in pursuit of efficiency and perhaps other goals. We thus proceed to examine and evaluate the tools government has at its disposal.

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[87] Public Law 108-100; 12 U.S.C. § 5001-18

[88] Of course, the government has an indirect interest in whether society is using the most efficient payment system. Changes in how people make payments can result in societal economic gains. *See* Wilko Bolt et al., *The Effect of Truncation Pricing on the Adoption of Electronic Payments: A Cross-Country Comparison*, Working Paper No. 05-28, Federal Reserve Bank of Philadelphia (Nov. 2005), available at http://www.phil.frb.org/files/wps/2005/wp05-28.pdf.

[89] Indeed, the Federal Reserve generally attempts to set its check collection fees so as to cover its associated costs. *See* http://www.federalreserve.gov/Boarddocs/testimony/1997/970916a2.htm (last visisted Sept. 5, 2006).

[90] *See supra* Part II.E.

[91] *See* Part IV.D.2.

Part IV. Affecting Preferences and Network Effects

Whether and how the government affects payment preferences depends on the role that the government has assumed, its precise goal, and the particular sort of payment system at issue. Depending on the situation, the government may (a) provide information that allows individuals to coordinate their behavior, (b) pass legislation or adopt policies aimed at reducing or eliminating concerns about a particular payment form, (c) provide incentives to induce individuals to adopt new payment systems, or (d) force change by eliminating or curtailing the older payment form. The next section examines these options, each of which represents an incremental increase in the amount of pressure placed on potential users of the new payment system.[92]

A. Focal Points and Information

As our earlier discussion of network effects suggested, payment systems require coordination: in order for a consumer transaction to occur, the seller needs to accept the payment form that the buyer tenders. The most innocuous means of facilitating coordination is for the government simply to provide information about different payment forms. The legend required by Check 21[93] is one example of this approach, as is the advertising campaign that accompanied the issuance of the revamped $20 bill. In both these examples, government action helped ensure that the public recognized a particular payment form as legitimate.

At a minimum, these sorts of informational efforts should ensure that a seller accepts particular methods of payment, at least when the method of payment requires no additional investment on the seller's part. As a very simple example, a buyer may offer an updated $20 when purchasing groceries. If the seller does not know that the bill is legitimate, and the buyer does not have any alternative means of payment, the coordination failure could result in a lost sale. But if the government has informed the seller through advertising of the bill's legitimacy, she is likely to accept it. Similarly, a

[92] *Cf.* Lawrence Lessig, *The Regulation of Social Meaning*, 62 U. CHI. L. REV. 943 (1995).
[93] "This a legal copy of your check. You can use it the same way you would use the original check." See *supra* text accompanying note 19.

seller who demands proof of payment is likely to accept a substitute check, provided she knows it is the legal equivalent of a traditional cancelled check. At the very least, then, government-supplied information helps ensure that individuals will *accept* one form of payment when they really prefer another.

As previously suggested, however, the success of a new payment form depends on overcoming the chicken-or-the-egg problem; not only does the public have to be willing to *adopt* the new form, but merchants must be willing to accept it, which in turn depends on merchants anticipating that a sufficient number of users will be on the opposite side of the platform. Government-provided information may influence use when it emphasizes the benefits of one payment form relative to another. For instance, when the Mint launched the Sacagawea one-dollar coin, it purchased a commercial that featured a vending machine repeatedly rejecting a frustrated individual's one-dollar bill.[94] The Mint ultimately decided against airing the commercial,[95] but we can easily imagine how a commercial demonstrating Sacagawea's consumer advantages would encourage use. That is, consumers would be initially attracted to the coin, vendors would anticipate this attraction, and consumers would similarly anticipate that vending machines would accept the coin. In other words, informational campaigns suggesting that one payment form is superior to another might influence network effects by both affecting the willingness of people to consider using the payment form in the first instance, and by influencing the predictions people make about the behavior of individuals on the other side of the platform.

Particularly when government is acting as fiduciary and seller, however, it may want to do more than just ensure use and acceptance of a particular payment form. Instead, it might desire that a particular payment form dominates. The government introduces the dollar coin, the Metrocard, or some other payment method because it sees an opportunity to increase efficiency and correspondingly reduce costs. As such, the government may try to make a particular payment form the focal point around which

[94] United States General Accounting Office, *New Dollar Coin: Marketing Campaign Raised Public Awareness but not Widespread Use,* at 21 (Sept. 2002) [hereinafter *Marketing Campaign*].
[95] Some Treasury officials believed that there was an informal policy to avoid comparing the dollar coin to the dollar bill, or to otherwise negatively compare the two forms of payment. *Id.*

individuals will voluntarily coordinate their behavior.[96]

As used in the economics literature, "focal point" refers to the place where individuals who need to coordinate their behavior gravitate. In Thomas Schelling's famed example, for instance, two parachuters who are unexpectedly separated must find each other. Schelling illustrates how one point on their maps may be focal, or the place where each would expect the other to go in order to meet up.[97] Richard McAdams uses Robert Sugden's Crossroads game to illustrate how government speech can create focal points.[98] In the Crossroads game, two cars approach an intersection on different roads. Both drivers prefer to maintain their respective speeds and have the other driver yield. Each driver's paramount interest, however, is in avoiding the collision that would occur if they both maintained speed. McAdams discusses how the state can erect signs that, independent of any legal sanction, act as focal points that allow drivers to coordinate whether to yield or continue forward.[99] Note that in both the parachuter and Crossroads examples, what is dominant or focal may not reflect an individual's personal preference. That is, the parachuter who is many miles away from the focal bridge may prefer to meet elsewhere, just as the driver whom the sign instructs to yield would prefer to continue forward. In each example, however, the individual subverts his own subjective preference because the need to coordinate is paramount.

One might expect that government-provided information is particularly likely to influence the public's choice of a particular payment system. Richard McAdams has posited that the law influences behavior because it creates expectations about how others will behave, and that people then coordinate their behavior around these expectations.[100] McAdams argues that the law is particularly effective at creating focal points, because (a) new laws often receive publicity, which helps create expectations; (b) legal expression is unique, and thus stands out from competing expressions; and (c) legal officials have a reputation for correctly predicting future behavior.[101] All of these factors make the legal

[96] *See generally*, Richard McAdams, *A Focal Point Theory of Expressive Law*, 86 VA. L. REV. 1649 (2000).
[97] Thomas C. Schelling, THE STRATEGY OF CONFLICT 55 (1970).
[98] McAdams, *supra* note 96, at 1704-05.
[99] *Id.* at 1706.
[100] *Id.*at 1651.
[101] *Id.* at 1666-71. As McAdams points out, this reputation is a byproduct of the publicity and uniqueness of the legal message. These two factors make the law an effective focal point. Legal officials may appear to

message louder, and thus more focal, than alternative messages. While McAdams is careful to note that loudness does not depend on the morality that is often associated with the law, he concedes that the legitimacy of the law matters because it further helps distinguish the legal message from the rest.[102]

McAdams' argument suggests that the government should be especially effective at making a particular payment system focal. Because the national government acts as fiduciary, it has particular legitimacy when speaking about payment methods. While this is most obviously true when the message concerns United States coins and currency, the authority should spill over to matters that are not directly connected to what constitutes legal tender. Moreover, the message should be highly salient when the government is selling a service like transportation; the message, after all, informs the buyer which sort of payment the seller prefers.

The Crossroads and parachuter examples, however, should illustrate the difficulty of convincing individuals to coordinate around a payment form that runs counter to their own preferences. Each example offers only one opportunity to coordinate, which stands in stark contrast to the realities of payment systems. That is, the parachuters' maps may show many possible meeting spots, but unless each parachuter independently decides to go to the same place, they will not survive. Similarly, one driver has to yield and the other has to go, or else the cars will crash or indefinitely stall.

With payments, however, myriad alternatives allow for coordination. That is, so long as alternative payment methods retain their legitimacy, the consumer does not risk coordination failure when she eschews a specific payment form. Most sellers will accept more than one form of payment; if a seller does accept only one form, it usually will be currency and coins, which everyone uses to some extent. Government-supplied information may influence expectations about how many users will be on the opposite side of the platform, and therefore may affect the willingness of merchants and consumers to *adopt* a payment system. After all, in equations (4) and (11), merchants and consumers are attempting to make predictions about the likelihood of increased

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simply be predicting future behavior, when in fact the law they promulgate actually shapes behavior. *Id.* at 1672.

[102] *Id.* at 1670.

utility from adopting the new system, and information supplied by the government about use by parties on the other side of the transaction can naturally alter these calculations. But information alone is unlikely to lead to increased use.[103] When the customer chooses among the payment systems she has already adopted, she knows which of her options the merchant will accept. Thus, coordination is beside the point. The question, then, is what else the government can do to affect decisions *to use* payment systems.

B. Gently Addressing Particular Concerns

Sometimes the refusal to use a new payment method may result from a particular concern about one or more aspects of the new method. For example, as credit cards became increasingly popular in the 1960s, the possibility of theft and unauthorized charges received much the same kind of attention that identity theft receives today.[104] Congress responded to this concern in 1970, when it amended the Truth in Lending Act to provide that credit card holders are responsible for no more than $50 worth of fraudulent charges.[105] At about the same time, Congress established specific criminal penalties for the fraudulent use of a credit card.[106] As another example, in 1978, Congress noted that while "the use of electronic systems to transfer funds provides the potential for substantial benefits to consumers," it was nonetheless problematic that the "rights and liabilities of consumers" were undefined.[107] Thus, as part of its Electronic Funds Transfer Act, the federal government limited an account holder's liability for unauthorized electronic fund transfers to $50.[108]

In all of these examples, the government spoke to consumers in its legislative role. These statutes simultaneously reassure consumers and endorse the controversial

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[103] We acknowledge that focal point information may generate increased use through the mechanism of sunk costs: if the information provided led to the consumer adopting the payment system, those costs may become sunk costs that then lead the consumer to increase use of the system. *See supra* text accompanying notes 50-54. Otherwise, though, information about coordination should have no effect on decisions to use a system.

[104] *See e.g.*, *He Who Steals My Purse Steals My Credit Cards*, TIME (June 19, 1964) (available at www.time.com/time/archive/printout/0,23657,871192,00.html).

[105] 15 U.S.C § 1643.

[106] 15 U.S.C. § 1644.

[107] 15 U.S.C. § 1693.

[108] 15 U.S.C. § 1693g.

payment form. The statutes limiting liability directly address a source of consumer reticence by ensuring that the financial institution, not the consumer, bears the risk of fraud. The statutes thus actively and visibly eliminated one barrier to widespread use, and thereby underscored governmental support for the new payment system. As for the statute imposing criminal liability, it also sent a message to consumers: that the government took credit card theft seriously and was taking steps to prevent it. Some consumers may have believed that with a criminal statute in place specifically addressing credit card fraud, fewer individuals would engage in fraud in the first instance. All of these statutes, then, illustrate an approach in which the government behaves more proactively than when it simply provides information and attempts to create focal points around which individuals can coordinate.

In addition to addressing particular concerns about fraud, the statutes influence network effects, albeit gently. Because these statutes remove a barrier to use, they make both consumers and merchants more confident that the particular payment system will become widespread. With this increasing confidence, more consumers, merchants, and institutions will invest in the new payment method. Their actions will have a feedback effect: as others become aware of this investment, they too will adopt the new form, and so forth.

C. Providing Incentives or, Alternatively, Imposing Sanctions

Sometimes, however, no particularized concern animates an individual's decision to eschew a payment form. Instead, the reticence is purely the result of the (perhaps irrational) preferences of individuals. When preferences are particularly strong, effective government action must make the benefits of the new payment form either larger or more tangible, or, alternatively, must make the non-user internalize the cost that her preference imposes on third parties. In other words, effective governmental action must incentivize use of the new payment form, or—depending on one's perspective—sanction use of the old payment form.

Such incentives can be quite effective. For example, Metrocard did not become popular with New York City subways riders until the transit authority offered free bus

transfers to Metrocard users,[109] and discounted tolls often contribute to a highway driver's decision to use electronic payment.[110] More indirect incentives may be effective as well. For instance, highway authorities can increase the number of lanes dedicated to electronic payment and decrease the number dedicated to traditional payment; after such tinkering, non-electronic users will experience the "cost" of even longer lines. Indeed, some highway authorities have gone so far as to reserve certain freeway entrances to electronic payers. Each of these incentives, whether direct or indirect, magnifies the costs of sticking with the old payment method.

In all these examples of incentives, of course, the government is acting as seller. This is unsurprising, because incentives are often expensive, at least in the short-term. When the government is acting as seller, it may have good reason to internalize the costs of incentives, because the long-term benefits from a switch in payment systems will outweigh the short-term costs. The problem for payment systems is that it may not always be possible to find a party to internalize the network externalities of the system, because the availability of profit opportunities may be limited. The most obvious example of this involves situations where the government is acting as a fiduciary.

The story of the Susan B. Anthony dollar coin illustrates the problem. John Caskey and Simon St. Laurent have persuasively argued that the coin failed because the government did not understand the importance of network effects or the economic theory underlying coin/note substitutions.[111] When the government launched the Susan B. Anthony in 1979, it was confident that the public would accept the coin and predicted widespread circulation within three to four years. The coin, however, was a colossal flop:

> Despite the mint's emphasis on designing a coin suitable for vending machines, most machines were not recalibrated to accept it. Vendors had begun updating their machines before the law passed, but as of 1979, only 250,000 of the four million vending machines had been updated. The cost per machine was $25 to $350 per machine, and given these costs, most vendors preferred to wait to see if the coin would become widely used before converting their machines . . .

[109] Andy Newman, *Hop On, Hop Off, The Unlimited Metrocard* Arrives, N.Y. TIMES, July 3, 1998 at B1.
[110] *See supra* note 85 and accompanying text.
[111] John P. Caskey & Simon St. Laurent, *The Susan B. Anthony Dollar and the Theory of Coin/Note Substitution*, 26 J. Money, Credit & Bank. 495 (1994).

> At the same time, the media, public and retailers were criticizing the coins for looking like a quarter, making it hard to distinguish.[112] Consumers complained about other features of the design, including color, reeded edge, and thickness. Because consumers did not want the coin, cashiers rarely offered it as change. Consumers declined to accept the coin from retailers as change, merchants returned the coin to banks, and banks, unable to distribute them and facing high storage costs, sent the coins back or did not reorder new ones.[113]

By January 1980, only 291 of the 750 million coins produced were in circulation. In March 1980, the government altogether stopped production of the Susan B. Anthony dollar.

The obvious problem with the Susan B. Anthony coin was network externalities. Merchants who were deciding whether to accept the Susan B. Anthony were aware of the accompanying costs, which included retooling vending machines or creating space in the cash register drawers and the risk that employees would confuse the coin with a quarter when counting money. From the merchant's perspective, accepting the coin made sense only if a large number of consumers would be presenting the Susan B. Anthony and if the merchant was likely to lose sales if she did not accept the coin.

As we have discussed previously, however, consumers had an incentive to adopt the coin only if a sufficiently large enough number of transactions existed where the benefits of the coin overcame the costs imposed by adopting the coin.[114] In this particular context, such situations were pretty limited. The main benefit of the coin was that it weighed less than the equivalent amount of quarters and would facilitate purchases in vending machines under then-existing technology. The costs came in two forms: first, the hassle of learning to identify the Susan B. Anthony as readily as other coins, and second, having to forgo transactions with vending machines or other merchants that did not yet accept the coin. Because at the beginning few vending machines accepted the coins, the costs here generally outweighed the benefits.[115] The resulting equilibrium was

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[112] This was a questionable criticism at best. The Susan B. Anthony was 43 percent heavier than a quarter, had the same size relation to the quarter as the quarter does to the nickel, and different engraving. *Id.* at 501.

[113] *Id.* at 500.

[114] *See supra* text accompanying notes 44 - 60.

[115] Of course, this is a generality and does not speak to all consumers or vendors. It is plausible that for some consumers, the benefits of the coin outweighed its costs. This could be either because (a) they

such that neither merchants nor consumers had an incentive to begin using the coin, and unsurprisingly, the Susan B. Anthony dollar was a flop.

In contrast to the Susan B. Anthony, credit cards initially faced a similar challenge but managed to overcome it. As S.J. Liebowitz and Stephen Margolis have noted more generally as to network externalities, the failure to adopt a new, superior standard represents "a profit opportunity for someone who can figure out a means of internalizing the [network] externality and appropriating some of the value made available from changing to the superior standard."[116] In other words, in some cases, an entrepreneur who can innovate a way to profit from the creation of a platform will find ways to internalize the network externalities in order to facilitate adoption of the payment system.[117] An example of this again is the growth of first the charge card industry, and then the credit card industry, over the past 50 years. In the first part of the story, charge cards went through a period of rapid growth following the creation of the Diners Club card because the founders of that card realized that they could make profits by extracting a high merchant discount fee (~7%) and giving the card to consumers at a fairly low cost (and a $5 annual fee).[118] In other words, Diners Club, and then American Express, were

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disproportionately had access to machines and merchants that accepted the coins and/or (b) they *liked* the coin—in other words, they obtained some sort of psychic benefit from having the coin. The existence of such a core of consumers will overcome the network externalities, however, only when it leads to what Professors Shapiro and Varian refer to as a virtuous cycle of positive feedback: a situation where other consumers and merchants adopt the product – here the coin – because they believe that others are also adopting the product. *See* SHAPIRO & VARIAN, *supra* note 42, at 173-77. Furthermore, in our view, payment systems generally share the same trait as information technology products: they are based on demand-side economies of scale. *Id.* at 179-80. That is, often the costs of producing the backbone of a new payment system are (relatively) small, and they do not fall significantly as the supply of such items increases. Instead, what drives the market is that the demand for the product increases as other participants adopt the system. As Shapiro and Varian note, this has a "beautiful if frightening implication: success and failure are driven as much by consumer expectations and luck as by the underlying value of the product. A nudge in the right direction, at the right time, can make all the difference." *Id.* at 181. Although Shapiro and Varian refer to consumers, in the context of multi-sided platforms like payment systems, it is both sides (merchants and consumers) who need to demand the product. For instance, as John Caskey and Gordon Sellon recognized in 1994, what was then holding back the debit card industry was not the lack of consumer demand, but merchant demand: consumers mostly had the means to make debit purchases—in the form of ATM cards—but merchants had to be convinced to purchase the equipment to process them. *See* John P. Caskey & Gordon H. Sellon, Jr., *Is the Debit Card Revolution Finally Here?*, Federal Reserve Bank of Kansas City Economic Review 79 (4th Quarter 1994).

[116] S.J. Liebowitz and Stephen Margolis, *The Fable of the Keys*, 33 J.L. & ECON. 1, 4 (1990).

[117] *See* EVANS & SCHMALENSEE, *supra* note 21, at 136.

[118] EVANS & SCHMALENSEE, *supra* note 21, at 54 & 59 (noting that the fee in 1958 dollars was $5). At the time, Diners Club earned roughly 70% of its revenues from merchants.

able to internalize the costs of getting the cards into the hands of consumers by extracting higher profits from merchants.[119]

In the second part of the story, as we described in Part II, credit cards became one of the dominant forms of payments in the United States when credit card issuers learned that they could make profits from the credit function of a credit card, which in turn allowed the company to offer the payment service of the card at a lower price.[120] This bundling of products – the payment product and the credit product – was not enough, however. The second important innovation was the improvements in the revolving credit industry that allowed credit card issuers to make greater profits from the issuance of such credit. Essentially, this created what might be seen as a three-sided platform market, involving merchants and two types of consumers: those who are only transacting and those who are financing. Credit card issuers also became more sophisticated in the marketing of their credit product and in their ability to decide to whom they should extend credit and under what terms.[121] These innovations allowed them to (mostly) eliminate annual fees, cut the costs charged to merchants,[122] and expand the contexts in which such cards could be used.[123] In other words, credit cards grew as a payment system because card issuers were able to extract more profits from consumers using the

[119] *Id.* at 150.
[120] *See supra* text accompanying notes XX-XX
[121] Mann, *Credit Card Policy*, *supra* note 21 at 9-10 (describing rise of credit sharing bureaus and computerized information processing as crucial to making credit underwriting more profitable); Bar-Gill, at 1388-94 (describing methods card issuers use to market cards to consumers).
[122] See Mann, *Credit Card Policy*, at 50 (noting the drop in interchange fees from 6% to 2%). Interestingly, the interchange fee of American Express charge cards remains higher (3%), in large part because American Express is unable to offset the interchange fee revenues with profits from the extension of credit. *Id.*
[123] For instance, in the 1990s**,** Visa and Mastercard revoked their long-standing rules that credit cards could only be used in transactions in which the cards were physically present. Allowing consumers to use credit cards in mail order and telephone order transactions (and later, in Internet transactions) has the obvious effect of increasing the attractiveness of such cards because it increases the potential set of transactions in which such cards can be used. The cost is increased opportunities for fraud. The actual costs of such fraudulent purchases are generally passed on to the merchant (as opposed to fraudulent card present transactions, where the direct costs are absorbed by the banks). This might suggest that the card companies have elected not to internalize the externalities of expanding credit cards into these markets. The amount of such fraud, though, has dropped from 15% to below 1%,, a result that we believe is the result of substantial sums spent by the card companies on programs such as Verified by Visa. *See* MANN & WINN , *supra* note 32, at 582-83.

cards for financing services and thereby cut the costs of the cards to purely transacting parties, which led to more merchants accepting the cards.[124]

The obvious question that arises, then, is why did the market not solve the problem for the Susan B. Anthony in the same way it did for credit cards? The answer, at least in the case of the Susan B. Anthony dollar, is that the profit opportunities for overcoming the network externalities were close to non-existent. There were no widely available additional products that could be bundled with the coin to underwrite its adoption.[125] Moreover, the government – the supplier of this particular multi-sided platform – could not subsidize one side of the platform by extracting extra payments from

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[124] In their book, Evans and Schmalensee ignore this second story, we assume because they see the financing function as separate from the transacting function of credit cards. *See, e.g.*, EVANS & SCHMALENSEE, *supra* note 21, at 150. While we agree with them that charge cards arose initially in reaction to the platform created by Diners Club and that the financing function was separate from the transacting function, *see supra* note XX, we reject the implicit notion that the bundling of the financing and transaction function has had no effect on the industry. We remain convinced that the growth of credit cards over the past 25 years has been the direct result of the credit function helping to subsidize the transaction function. *See also supra* text accompanying notes XX-XX.

Of course, one interesting issue is why competition in the provision of credit to consumers did not lead to the bundling of credit products with other goods and services. In other words, why do we not see consumer credit provided at cheaper rates than credit cards provide, or at least why we do not see the provision of credit services tied to products other than charge cards? Professor Bar-Gill's paper provides perhaps part of the answer: the structuring of the transactions in credit cards leads consumers to underestimate the likelihood that they will use the credit function. Bar-Gill, *supra* note 20, at 1395-1401 & 1404. Consumers become sort of accidental borrowers, such that they use the credit services even though they never thought they would at the time they contracted for the services. That answer, though, is not a complete one, for it does not answer why other services have not been similarly structured to create such "accidental" borrowing. For instance, why not tie the sale of cell phone services in the same way? A cell phone company might provide a low cost product, with the understanding that all unpaid balances would be rolled over into a credit product just like with a credit card. Why do we not more frequently see such arrangements? The answer, as we will describe below, is that we may be seeing exactly this development.

[125] It is not impossible to imagine a hypothetical product that might do this. Say, for instance, that a vendor stood to make significantly more profits if consumers switched from using quarters to the coin. Imagine a soda company whose products are generally $1 (remember, this is just imaginary). Also suppose that the soda company, by fostering adoption of the Susan B. Anthony dollar, might save large amounts in the collection and transportation of coins from vending machines such that it is willing to give consumers a discount for purchasing with a dollar coin rather than with another assortment of change. Under these circumstances, the soda vendor's decision might give consumers sufficient incentive to adopt the coin that it initiates a virtuous cycle of positive feedback, leading to widespread adoption of the coin, particularly if enough other vendors did the same thing.

We can imagine at least two reasons why this did not happen with the Susan B. Anthony coin. First, it is unlikely that the cost savings to merchants of the coin over quarters were sufficient to give them an incentive to give any sort of discount for such purchases. Second, as others have noted, discounts to prices for using a particular payment service seem to be disfavored in the market. *See supra* note XX (describing the failure of cash discounts to take hold, despite merchants' incentives to prefer cash payments over charge card payments). The reason for this reluctance may be that if a particular vendor had attempted the discount strategy, other vendors may have preferred to compete not by also offering the discount, but instead by offering equal prices to consumers, rather than cash discounts. The competitor's slogan might be "You never have to worry about what sort of change you have when you buy a Brookdale soda!"

another side. Of course, the government could have paid merchants and/or consumers to use the coin, but the complete absence of a discussion of that possibility in the literature suggests that it is beyond the pale.[126]

The strategy adopted by the credit card issuers is not the only way for a party to try to overcome network externalities and promote a new payments system. As Professors Shapiro and Varian point out, there are two basic ways to internalize switching costs. The first is to reduce those costs by making it easier to switch products. This was the method used by the charge card industry to get consumers to adopt the cards in the 1950s and 1960s. The second way is to increase the benefits available from the new network, thereby making the benefits of the switch outweigh its costs.[127] Increased benefits may make a payment system essentially irresistible to one side. For instance, restaurants and hotels accepted charge cards despite the quite high initial discount fees because the cards attracted additional well-heeled customers. Thus, in our example of the Susan B. Anthony coin, the government might still have succeeded *if* it was putting forth a product that had much greater benefits for both consumers and merchants. But in reality, the coin was not a radical improvement from the perspective of either group, and therefore was doomed to failure.

What our analysis suggests so far is that the role the government plays largely determines how far it will go to influence preferences about payment systems. When the government is acting as seller, the cost savings associated with a particular electronic payment form may spur the government to offer incentives, which in turn may overcome strong individual preferences and network effects. When the government is acting as law-maker, in contrast, it is likely to limit itself to providing information and addressing

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[126] In truth, the government already subsidizes all forms of currency in its role as fiduciary. *See* EVANS & SCHMALANSEE, *supra* note 21, at 30 (noting that "many of the costs of cash are hidden in the government's budget").

[127] Professors Shapiro and Varian refer to these approaches as (a) the evolution strategy of compatibility and (b) the revolution strategy of compelling performance. SHAPIRO & VARIAN, *supra* note 42, at 190-91. They later clarify, though, that the evolution strategy "centers on reducing switching costs so that consumers can gradually try your new technology," *id.* at 192, and that the revolution strategy focuses on "offer[ing] a product so much better than what people are using that enough users will bear the pain of switching to it," *id.* at 195.

Evans and Schmalensee similarly suggest that two ways to solve the problem are to cut the price for one side, perhaps to even pay that side for adoption, or to "invest in one side of the market." EVANS & SCHMALENSEE, *supra* note 21, at 143. Obviously, cutting the financial costs, or even paying a party to adopt a new system, is a way to reduce the switching cost, whereas we see decisions to invest in the market as a way for a system supplier to offer a better product to that side of the market.

particularized concerns, and leave the incentivizing to the third-party institutions that stand to gain from consumers making the switch. But so far, our analysis has suggested that when the government is acting as fiduciary, it is relatively powerless in the face of strong subjective preferences or network effects. That is, even when the government is "smart" about influencing preferences, it is likely to be unsuccessful.

D. Withdrawing Alternative Payment Forms

The Sacagawea dollar coin is another case in point. The launch of "The Golden Dollar"[128] was accompanied in 2001 by a $67 million marketing and education campaign.[129] The Mint initially shipped large quantities of the coin not only to the Federal Reserve, but also to Wal-Mart and other retailers, all in an effort to promote widespread use.[130] The coins were also give-aways in Cheerios boxes, at sporting events, and at various transit hubs. These promotions distributed more than 132 million coins to consumers. The Mint also conducted outreach to merchants in industry sectors that were most likely to use the coin and increased the use of the coin in federal facilities, such as post offices and military bases.

As almost any reader can deduce from looking in her pockets, all of these efforts were of little avail. While the Mint's efforts dramatically increased public awareness of the coin, it had little effect on actual use. Demand for the coin was highest in the first year of the launch and declined rapidly thereafter. In 2004, a General Accounting Office poll found that 97 percent of Americans had not used the coin in the past month and that 74 percent could not remember ever using one. Because hindsight is twenty-twenty, it may initially be difficult to see why the roll-out of the Sacagawea was "smart." But in fact, the Mint acted on almost every suggestion that had been made by experts who had studied the Susan B. Anthony.[131] Indeed, the government, in a very limited fashion, even did what we suggested earlier was beyond the pale; that is, it paid merchants and

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[128] United States General Accounting Office, *New Dollar Coin: Public Perception of Advertising*, at 1 (April 2000).
[129] *Marketing Campaign*, supra note xx, at 5.
[130] *Id.* at 22-23.
[131] This is not to say that the launch of the Sacagawea was flawless. In particular, the GAO noted some barriers in distributing the new coin and the difficulty of obtaining a reliable supply of new coins, as well as higher delivery fees by armored carriers. *Marketing Campaign*, *supra* note 94, at 3.

consumers to use the coin, in the sense that it gave more than 132 million away for free during promotionals.[132] But in the face of particularly strong preferences and network effects, the government, acting as fiduciary, was unable to convince consumers and merchants to switch.

To be sure, the Mint could have pushed consumers and merchants toward widespread use of the Sacagawea by withdrawing the competing dollar note. Indeed, most experts agree that in light of public resistance to using a dollar coin and the "psychological cost associated with a change of a habit,"[133] no dollar coin will succeed until the dollar bill is withdrawn from circulation.[134] In the countries that make up the G-7, the United States is the only one that attempts to co-circulate a high-denomination coin and a note of the same value.[135] Other G-7 countries, such as Canada, the United Kingdom, and Japan, have succeeded in introducing high-denomination coins by withdrawing the competing note.[136] This, in turn, suggests that, even when government is unable to provide strong incentives or to create a payment form that has a much greater benefit for both consumers and merchants,[137] it can ensure the success of the payment form by eliminating or severely curtailing the alternatives.

1. Forcing the Public's Hand

Withdrawing or curtailing the competing payment system may initially seem counter to the current wisdom among those who study how the government can most effectively influence social behavior. Dan Kahan, for example, has theorized about situations in which lawmakers attempt to change pervasive social norms, such as the belief that "no sometimes means yes" or that it is acceptable to drink and drive.[138] Kahan has argued that "gentle nudges" are more effective than "hard shoves," or in other words, that lawmakers can change prevalent social norms with a series of incremental measures aimed at gradually affecting public opinion. As one example, Kahan contrasts the ineffective tobacco prohibitions of the early 20th century with the "pattern of escalating

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[132] *Id.*, at 9.
[133] Quote from Lotz & Rocheteau, Federal Reserve Bank of Cleveland.
[134] *E.g.*, *Marketing Campaign*, *supra* note 94, at 18; Caskey & St. Laurent, *supra* note 83, at 507.
[135] *Marketing Campaign, supra* note 94, at 20.
[136] *Id.*
[137] *See supra* text accompanying notes 161- 62.
[138] Dan M. Kahan, *Gentle Nudges vs. Hard Shoves: Solving the Sticky Norms Problems*, 67 U. Chi. Law Rev. 607, 633 (2000).

change" that began with warning labels in the 1960s and culminated with severe restrictions on public smoking in the 1990s.[139] Kahan argues that the former were "contemptuously defied" because outright prohibition condemned smoking more strongly than most of the public did, and that the latter succeeded because it helped "ground an emerging perception of smokers as deviants, as well as an emerging expectation that individuals conform to the anti-smoking norm."[140]

Kahan summarizes his argument this way:

> If the law condemns . . . the conduct substantially more than does the typical decisionmaker, the decisionmaker's personal aversion to condemning too severely will dominate her inclination to enforce the law, and she will balk. Her reluctance to enforce, moreover, will strengthen the resistance of other decisionmakers, whose reluctance will steel the resolve of still others, triggering a self-reinforcing wave of resistance.
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> If, however, the law condemns the behavior only slightly more than does the typical decisionmaker, her desire to discharge her civic duties will override her reluctance to condemn, and she will enforce the law. Her willingness to enforce will now strengthen the willingness of other decisionmakers to enforce. . . . In the resulting wave of condemnation, lawmakers will be able to increase the degree of condemnation reflected in the law without prompting resistance from most decisionmakers.[141]

In other words, laws aimed at changing norms will be successful if they gradually pull public opinion forward, but will produce detrimental backlash when they attempt to force a sudden change of public opinion. While Kahan is primarily concerned with questions of norm management, preferences are relevant here too. Whether a decisionmaker complies with the law is a function of the interaction between "her personal degree of condemnation and her preferences to discharge her legal obligations."[142]

However, our study of payment systems suggests that, sometimes, changing preferences necessitates hard shoves; that, without them, preference change will be unsuccessful.[143] So why, in this context, should the government sometimes force the

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[139] *Id.* at 626.
[140] *Id.* at 627.
[141] *Id.* at 608.

[142] *Id.* at 613.
[143] Kahan notes two instances in which hard shoves are unlikely to produce backlash. The first is when "there is widespread consensus against the norm that the law is trying to change or suppress"; the second is when "dissensus about a norm radically polarizes society." *Id.* at 619-20. Neither of these examples explains why hard shoves are effective in the context of payment systems.

public's hand? The answer hinges on condemnation, which, as the above quotation suggests, is central to Kahan's analysis.

For the most part, Kahan's hard shoves are ones that involve the criminal law; his hypothetical decisionmakers are prosecutors, jurors, and sentencing judges. A criminal conviction and the resulting punishment symbolize condemnation by one's fellow citizens. Kahan hypothesizes that decisionmakers resist hard shoves because they are unwilling to condemn; that is, when the law punishes behavior more severely than the decisionmaker would prefer, the decisionmaker will sometimes choose not to enforce the law.

But while condemnation is inherent in the criminal law, the decision to forego a particular payment method is unlikely to form the basis for condemnation. Take, for instance, the individual who steadfastly refuses the Sacagawea coin. Even the hardest possible shove—that is, the withdrawal of the competing note—will not be seen as condemnatory, regardless of whether most individuals favor or disfavor the coin, or are simply ambivalent about it. Payment systems are usually just not the sort of stuff that gives rise to moral posturing. The refusal to condemn is what produces Kahan's self-reinforcing wave of resistance. When the possibility of condemnation disappears, so does the risk of a "self-enforcing wave of resistance" that bolsters the very norm the government is seeking to change.[144] Because there is no condemnation in the context of payments hard shoves are more effective than gentle nudges.

2. Three Illustrations

Three examples, two historical and the other contemporary, help illustrate the point. The historical examples stem from the need to finance the Civil War and require a bit of exposition. The contemporary example is the adoption of the euro, a story with which most readers will be somewhat familiar. Taken together, these examples not only show the effectiveness of hard shoves, but also demonstrate that "hard shove" is not synonymous with "the most heavy-handed measure possible." The examples also demonstrate that while governments do not have to worry about preference backlash when they are not engaging in condemnation, they are nonetheless restrained by political consequences.

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[144] *Id.* at 608.

We begin with demand notes and the legal tender provision. Prior to the Civil War, the federal government conducted its business in specie, i.e., through the use of coined money. As the cost of the Civil War began to vastly exceed projections, the United States borrowed through demand notes to help close the gap between revenue and expenditures. These demand notes did not bear interest and were paid to government employees and suppliers in lieu of coin. As their name suggests, the notes initially entitled the bearer to obtain specie from the Treasury upon demand. In 1862, however, Congress issued demand notes that were redeemable in interest-bearing bonds, not in specie. Congress further specified that these demand notes (colloquially known as greenbacks) were "lawful money and a legal tender in payment of all debts, public and private, within the United States."[145] This was, of course, the predecessor to our present legal tender statute.

Because the legal tender provision required government creditors to accept demand notes, its potential consequences were profound. If legal tender is competitively priced in the marketplace, the receiver should be largely indifferent between accepting the tender or another market equivalent. If the receiver prefers a different form of payment, such as specie, she can simply exchange what was tendered, with little loss of value.[146] But if the tender is artificially set above its market value, the creditor has gotten less than the market equivalent in other goods or monies. The creditor thus will prefer some other form of payment over the legal tender.[147]

This is precisely what unfolded during the inflationary period of the Civil War. Gold quickly rose to a premium against greenbacks, at one point reaching a high of 185 percent.[148] Creditors who were owed a $100 debt would have preferred $100 in coin, or at least the amount of greenbacks that equaled the gold value of the debt.[149] Legal tender provisions, however, prevented the creditor from acting on this preference; instead, the creditor simply had to accept $100 worth of greenbacks in satisfaction of the debt.

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[145] Act of February 25, 1862, sec. 1, 12 Stat. 345.
[146] Farley Grubb, *The U.S. Constitution and Monetary Powers: An Analysis of the 1787 Convention and How a Constitutional Transformation of the Nation's Monetary System Emerged,* at 5-6 (copy on file with authors).
[147] *Id.* at 6.
[148] Kenneth Dam, *The Legal Tender Cases*, 1981 SUP. CT. REV. 367, 374 (citing MITCHELL, GOLD, PRICES AND WAGES UNDER THE GREENBACK STANDARD 4 (1908)).
[149] *Id.* at 374.

The legal tender provision was a particularly hard shove and was (and still is) of questionable constitutionality.[150] What is most relevant for our purposes, however, is how the legal tender provision eliminated the complications of network effects. In our discussion of the Susan B. Anthony, we suggested that the coin failed because: (a) the government lacked profit opportunities that would have allowed it to subsidize either consumer or merchant use, and (b) the coin did not offer greater benefits for consumers and merchants, such that they would opt for the coin in the absence of such subsidies. Similarly, demand notes were markedly less beneficial than specie from the creditor's perspective, and any subsidy flowed from the creditor to the government, not the other way around. Compared to demand notes, then, the Susan B. Anthony was the greatest thing in monetary policy since the demise of the fei.[151] But because the government used the hard shove of the legal tender provision, creditors had to accept them.

The 10 percent tax on state bank notes was another hard shove that stemmed from the government's effort to finance the Civil War. After the charter of the second Bank of the United States expired in 1836, the federal government temporarily withdrew from supervising the nation's banking.[152] Banks created under state law flourished. By 1861, more than 1600 of these banks existed, and, until the issuance of demand notes, state notes functioned as the nation's only non-coin currency. Many of the notes traded at a discount from face value, depending on public confidence in the issuing bank and the distance from the community in which the notes had been issued.[153] The sheer number of notes and the confusion over their value created conditions that were ripe for counterfeiting, and thus fraudulent notes circulated as well.[154] As one historian has described, "As far as paper money was concerned, the chaos was almost indescribable."[155]

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[150] *See* Hepburn v. Griswold (striking down legal tender provision); Knox v. Lee (overruling Hepburn and finding legal tender legislation constitutional). For a discussion of the Framer's intent regarding legal tender, see generally Farley Grubb, *supra* note 146*;* Dam, *supra* note 148, at 382-90.

[151] See MILTON FRIEDMAN, MONEY MISCHIEF 3-4 (1992) (describing the medium of exchange on island of Uap, where natives used fei, that is, stone wheels that were so large they needed to be rolled from one person to the next.)

[152] For a full account of the rise and fall of the Second Bank of the United States, see HAROLD UNDERWOOD FAULKNER, AMERICAN ECONOMIC HISTORY 157-60 (8th ed.).

[153] *Id.* at 511.

[154] Dam, *supra* note 148 at 375.

[155] FAULKER, *supra,*note 152, at 511.

The National Bank Act of 1863 (as amended in 1864 and 1865) changed all this. The Act authorized nationally chartered banks, which were permitted to issue a new form of paper currency known as the National Bank Note. These new national banks were subject to much stricter regulation than their state bank competitors. The national banks had to satisfy minimum capital requirements, to refrain from making speculative loans, and to back up deposits with specified reserve amounts. In addition, banks that issued National Bank Notes had to own at least an equal amount of United States government securities.[156] These regulations placed the nationally-chartered banks at a serious competitive disadvantage with the state banks.[157] Congress countered this competitive threat by placing a 10 percent tax on the issuance of state bank notes, which were the state banks' primary source of income. The 10 percent tax made the issuance of state notes "virtually prohibitive,"[158] and state bank notes quickly disappeared from circulation. Without this source of income, the number of state banks dropped to fewer than 250 by 1868.[159] The traditional story of the 10 percent tax, then, is that it drove out chaotic and unregulated state currency, and that it helped create a market for United States bonds, which were necessary to finance the Civil War.[160]

In terms of its effect on payment forms, the 10 percent tax effectively eliminated the state bank alternative to the national notes. But it may not have been the most heavy-handed means available to Congress. In *Veazie Bank v. Fenno*,[161] a Maine bank challenged the 10 percent tax. Although the bulk of the Supreme Court's opinion addressed arguments about whether the tax was direct (which would have required it to be laid in proportion to the Census), Veazie Bank also contended that the tax was unconstitutional because its purpose was to altogether prevent state banks from issuing notes .[162] The Court disposed of this argument by stating that it was irrelevant whether the tax was an indirect attempt to outlaw state notes because Congress had the power to

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[156] HARRY D. HUTCHINSON, MONEY, BANKING, AND THE UNITED STATES ECONOMY 61-62 (4th ed.)
[157] *Id.* at 62.
[158] HUTCHINSON, *supra* note 156, at 62.
[159] *Id*. By the mid-1870s, state banks had rebounded by replacing the income they lost from the issuance of notes with income from providing borrowers with newly-established checking accounts. *Id.* at 63.
[160] FAULKER, *supra,*note 152, at 511.
[161] 75 U.S. 533.
[162] *Id.* at 548.

directly prohibit the notes.[163] As one constitutional scholar has described, on this point *Veazie* is "more than a little glib and was certainly generous in its interpretation of congressional power."[164]

But if, in fact, Congress had the authority to directly outlaw the notes and perceived itself as having this authority, the 10 percent tax emphasizes an important point: when we suggest that the government use hard shoves to ensure the success of a payment form, we do not mean that the government should use the hardest possible shove. Instead, the government should do only what is necessary to make a particular payment system prevail. There is usually good reason to use the lightest touch possible, either because the government may be concerned about exceeding its authority, or because it is often politically astute to appear to be doing something less than steamrolling over constituent preferences.

This point may have particular relevance for the 10 percent tax. At least one scholar has questioned the traditional account of Congressional motives and argued that the state banking system was considerably sounder than the traditional account admits. As George Selgin points out, if state bank notes were clearly inferior to national bank notes, then no tax should have been necessary to drive them out of existence; rather, consumers should have adopted national bank notes even in the absence of a prohibitive tax.[165] Selgin posits that the tax drove out state bank notes "that were considered just as good for most purposes as their national counterparts."[166] If Selgin's historical account is accurate, then the 10 percent tax did not simply cement a system that consumers were inclined to favor; rather, it forced consumers to use national bank notes instead of the state alternative.

In any event, the combined effect of legal tender provision and the 10 percent tax was transformative. Prior to the Civil War, the nation had two forms of currency: coin and state bank notes. By the War's end, the nation had three sources of currency: coin,

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[163] *Id.* at 549.
[164] DAVID CURRIE, THE CONSTITUTION IN THE SUPREME COURT: THE FIRST HUNDRED YEARS 1789-1888 319 (1985). As Currie explains, "The only explicit authority referred to was the power to coin money, and . . . there was considerable doubt whether that power even authorized the issuance of paper money, much less empowered Congress to forbid state bank notes." *Id.*
[165] George Selgin, *The Suppression of State Banknotes: A Reconsideration*, 38 Econ. Inquiry 600, 600 (Oct. 2000).
[166] *Id.* at 607.

demand notes, and national bank notes. Indeed, it is not hyperbole to say that the monetary hard shoves of the Civil War period created the governmental role of fiduciary as described in this paper, which largely contemplates the government acting to protect or replace its paper money.[167] People may have preferred hard money during the Civil War era, but that preference was effectively steamrolled. When the government makes a strong shove for a particular payment system, the shove tends to stick, at least as long as the government itself sticks. This is a point we return to after our discussion of the euro.

To be fair, the European Union and the 12 member countries that launched the euro had worked hard to avoid the necessity of a shove.[168] The euro was a long time coming. As early as 1957, the Treaty of Rome declared that Europe would strive for a common European market. The Single European Act (1986) and the Treaty of the European Union (1992) built on this objective by introducing the Economic and Monetary Union, which provided the foundation for a single currency. In 1995, the European Council coined the name "euro."[169] In 1999, the exchange rate for each national currency was set and the euro was officially launched, but it operated without any tangible manifestation. For three years, each country continued to use its own notes and coins, although European stock exchanges and banks were required to use euros for all non-cash transactions.[170] Euros, for this period, were exclusively digital.

Then came the hard shove. On January 1, 2002, euro bank notes and coins began to circulate. With the exception of Germany, each country allowed a brief interlude (typically two months) during which both euros and national currency were legal tender. But at the end of the dual circulation period, national notes and coins were no longer legal tender, although they could still be redeemed for euros. Citizens in the 12 member countries could no longer avoid the euro, regardless of their preferences.

These preferences were and are decidedly mixed and, in some countries, markedly negative. The European Commission has monitored public opinion about the

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[167] *See Veazie*, 75 U.S. at 549 ("Having . . . undertaken to provide a currency for the whole country, it cannot be questioned that Congress . . . may secure the benefit of it to the people by appropriate legislation.")

[168] The 12 member countries are Greece, Germany, Belgium, Spain, France, Ireland, Italy, Luxembourg, the Netherlands, Austria, Portugal, and Finland. Information available at http://www.euro.ecb.int./en/section1/timetable.GR.html (last visited Sept. 5, 2006).

[169] Pun absolutely intended.

[170] Information available at www.euro.efcb.int/en/what/history/html.

euro since March 2000. Although the questions vary a bit from survey to survey, the Commission's work provides a continuing snapshot of the euro's reception. The upshot of this polling data, excerpted below, is that significant numbers of citizens across the 12 member countries would have preferred not to have the euro in the first instance,[171] and that more than four years of life with the euro seems to have not dramatically affected attitudes toward it.

> * Just five weeks before the launch of euro banknotes and coins, 48% of people polled in the 12 member countries thought the euro "will mean more advantages than disadvantages [to them] personally," while 40% expected more personal disadvantages. In Germany, the country most hostile toward the euro, 41% expected more personal advantages, while 51% expected more disadvantages.[172]
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> * One year after the launch of euro banknotes and coins, 50% of the people polled in the 12 member countries described themselves as happy that the euro had become their country's currency; 39% as unhappy, and 11% as neither happy nor unhappy. In Germany, 28% described themselves as happy; 68% as unhappy, and 4% as neither happy nor unhappy.[173] In a related measure, 54% of the people polled in the 12 member countries described themselves as believing the adoption of the euro was "advantageous overall" and would "strengthen their country for the future," whereas 32% described the adoption as disadvantageous, and 7% perceived no change. In Germany, 39% believed euro adoption was advantageous for their country overall; 52% believed adoption was disadvantageous, and 4% perceived no change.[174]
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> * Two years after the launch, 47% of the people polled in the 12 member countries described themselves as happy that the euro had become their currency; 44% described themselves as unhappy, and 9% were neither happy nor unhappy. In Germany, 30% described themselves as happy; 67% described themselves as unhappy, and 2% described themselves as neither happy nor unhappy.[175] In another measure, 52% of the people polled in the 12 member countries described the adoption of the euro as advantageous overall for their country; 36% described it as disadvantageous overall, and 5% perceived no change. In Germany, 42% believed adoption was advantageous; 52% believed it was disadvantageous, and 2% perceived no change.[176]

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[171] Of course, some countries, such as Ireland, have been enthusiastic about the euro since the beginning.
[172] Gallup Europe*, Flash EB N 115 Attitudes on the Euro (15/11/2001 – 26/11/2001),* at 50 (Jan. 2002).
[173] Gallup Europe, *Flash EB N 139 The Euro, one year later,* at 74 (Nov. 2002).
[174] *Id.* at 66.
[175] Gallup Europe, *The Euro, two years later,* at 54 (Dec. 2003).
[176] *Id.* at 47.

> * Three years after the launch, 53% of the people polled in the 12 member countries described adoption of the euro as advantageous overall for their country; 36% described it as disadvantageous, and 5% perceived no change.[177] In Germany, 41% found adoption advantageous for their country; 50% found it disadvantageous, and 5% perceived no change.[178]
>
> * Four years after the launch, 51% of the people polled in the 12 member countries recognized adoption of the euro as advantageous for their country overall; 39% as disadvantageous, and 6% perceived no change.[179] In Germany, 47% perceived adoption as advantageous for their country; 48% perceived it to be disadvantageous, and 39% perceived no change.[180]

Indeed, what is particularly striking is how post-euro preferences remain largely unchanged. But while the story of the euro is still unfolding, no one expects that these preferences will create a backlash that will resurrect national currencies, even in countries like Germany.

This is not to say, of course, that the adoption of the euro has not had political consequences. Former German chancellor Helmut Kohl, for instance, writes in his memoir that he forced the euro on the German people against their will and that they voted him out of office because of it.[181] As other example, many commentators believe that the Netherlands recently voted to reject the European Constitution because of widespread dissatisfaction with the euro.

This emphasizes another larger point: in contexts where the government action invokes condemnation, the backlash predicted by social norm theory is one potential restraint on governmental action. No government wants to end up reinforcing the very action it sought to discourage or making the behavior it was trying to promote even less preferred. But just because a government that legislates or makes policy decisions about payment systems does not have to worry about preference backlash, it nonetheless has to concern itself with political consequences. This is the perfectly obvious observation that politicians are held accountable by their constituents. As such, governments engaging in hard shoves have the heavy burden of demonstrating that the promoted payment system genuinely benefits either the country as a whole or significant numbers of its citizens, or

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[177] Gallup Europe, *The Euro, three years later*, at 38 (Dec. 2004).
[178] *Id.*
[179] Gallup Europe, *The Euro, four years later*, at 32 (Nov. 2005).
[180] *Id.*
[181] Helmut Kohl, MEIN TAGEBUCH 178 (2000).

that the payment system is necessary to serve some larger purpose. The architects of the legal tender provision, for example, may have perceived it as necessary to preserve the solvency of big commercial banks, which would in turn allow for the sale of government bonds, which would in turn finance the Civil War.[182] The European governments that adopted the euro believed that a common currency would result in economic strength; in time, their citizens will learn whether these governments were right.

To connect back to a discussion earlier in the paper, if the United States government really wants Americans to adopt a dollar coin, then it should proceed with the hard shove of withdrawing the competing paper note. This would have two advantages. First, this is the mechanism most likely to result in success. Second, and just as important, this route has the benefit of clarity. In replacing the dollar bill, the government will have the burden of demonstrating that the switch benefits the economy as a whole.[183]

Part V. Government Action and the Future of American Payment Systems

Payment methods are poised to continue the massive evolution that has occurred over the past twenty-five years. For instance, payments vendors are increasingly pushing various smart card systems. Building on the success of SpeedPass (the ExxonMobil system which allows drivers to purchase gas at the pump with the wave of a smart card), both Visa and Mastercard are involved in projects to allow for so-called "contactless" payments. As we noted in the Introduction, cellular phones may also soon become "digital wallets" that can pay for purchases, check balances, pay bills, and transfer funds.[184] Finally, at least one government has begun to discuss whether it should issue electronic money.[185]

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[182] For an explanation of why the legal tender provision was advantageous for commercial banks, see Dam, *xupra* note 148, at 408-10.
[183] See Caskey & St. Laurent, *supra* note 83, at 506 (making same point).
[184] Eric Dash & Ken Belson, *Ring Up My Bill, Please: Mobile Payment Via Cellphone*, N.Y. TIMES, Mar. 21, 2006, at C1 & C4.
[185] The government is that of Singapore. *See* Leo van Hove, *Making electronic money legal tender: pros & cons* (unpublished manuscript, Oct. 5, 2005) (on file with authors) (manuscript at 13).

Advocates of these new systems are increasingly likely to attempt to involve government in promoting their new payment mechanisms. As Part IV illustrated, the federal government has a number of tools at its disposal that can promote the adoption of a payment system. Because vendors will have made large investments in these systems, they have powerful incentives to call upon the government to aid them. In this final Part, we suggest that such government intervention is often unwise, for three reasons. First, technology moves quickly and the government (usually) moves slowly As such, by the time the government intervenes, the "new" payment method it seeks to support might already be on its way out. Second, with a bit of time, new payment systems that are sufficiently advantageous to the consumer are likely to flourish and thus governmental intervention is ultimately unnecessary. Third, such intervention may have the unintended consequence of undermining the incentive to invest in new payment technologies in the first instance. The next Part discusses the first two possibilities in the contexts of Check 21 and the evolution of electronic giros in two European countries. We then illustrate the third possibility by describing in a little more detail where the payments industry is likely to go over the next decade (always a dangerous task) and what actions industry players may call upon Congress to take. We then conclude with a few thoughts on electronic currency, which is perhaps the most radical emerging payment system.

A. Check 21

As we described in the Introduction, Check 21 was designed to facilitate the exchange of electronic checks between banks. But, as a legal matter, no law was necessary to achieve this result. Prior to the passage of Check 21, no statute said that banks *had to* present paper checks to other banks for collection. Even in the wake of Check 21, the law is silent on the form of technology used to exchange checks. All Check 21 provides is that banks can no longer require that the original check be returned to them; instead, they have to accept some sort of electronic substitute. The legislation was aimed at remedying a variant on the classic network effects problem. Banks would not invest in the technology to allow electronic truncation because an insufficiently large number of other banks had adopted the technology. Presumably, given the billions of

dollars that electronic truncation was expected to save the banking industry, the technology should have eventually caught on. But there was one additional complication: consumers who like receiving back their original checks.[186] While banks, left to themselves, might have quickly migrated to electronic truncation, some banks were concerned they would lose customers if they, but not their competitors, switched to electronic truncation. The problem was thus that the entrenched preferences of some consumers gave banks little incentive to move to the new system, even though it promised large savings. Furthermore, at least at the time that Check 21 passed, no intermediary had emerged to internalize the switching costs.

Into this quagmire came Congress. In Check 21, the national legislature solved the problem of consumer preferences by applying what amounted to a hard shove. No matter where a consumer banked, she could not be guaranteed the return of her original checks, because her bank could not insist upon the return of the original from other financial institutions. In addition, through the use of the legend we discussed in the Introduction, Congress attempted to educate consumers about the legal status of electronic checks and their printouts. But the key was the hard shove.

What is complicated about this story is that the hard shove does not appear either necessary or successful. Even without Check 21, a significant percentage of check payments were likely to migrate to electronic payments as a result of accounts receivable check conversion ("ARC"). In the ARC process, a creditor takes a check written by a consumer to pay a bill and uses that check as an authorization to initiate an electronic direct debit from the consumer's account (in other words, a payment flowing in the opposite direction of a direct deposit). Consumers are given some form of notice that the company will be engaging in the practice and the opportunity to opt-out, but very few do.[187] In 2004, more than a billion checks were converted to ARC payments,[188] and in

[186] One further complication was that in the two states in which Revised Articles 3 and 4 have not yet been adopted –New York and South Carolina—consumers retained a statutory right to receive their paper checks back.
[187] *See* NACHA website at http://www.nacha.org/news/news/pressreleases/2005/Pr042005/pr042005.htm (last viewed Mar. 29, 2006).
[188] *Id.*

2005, the amount was over 1.6 billion.[189] In addition, another 160 million checks were converted to electronic payments at the point of sale in what are known as POP transactions. In these, the consumer presents a check to a merchant, who then uses the check to initiate a direct debit from the consumer's checking account (using the bank routing number and the account number found on the bottom line of the check), and then returns the check to the consumer as a receipt.[190] Given the explosive growth in such alternatives to check truncation, it is far from clear that Check 21 was necessary.

In fact, to date, the scant evidence suggests that Check 21 has been particularly unsuccessful. For instance, in a Federal Reserve Bank of Kansas City publication in April 2005, the authors conceded that widespread electronic clearing of checks had not yet occurred and that, under existing conditions, electronic truncation was *more expensive* than paper check processing.[191] Another report by the Federal Reserve Bank of Chicago suggested that, nine months after passage, only 1% of the checks processed by the Federal Reserve Banks were substitute checks.[192] Assuming this number is correct, only about 130 million checks were converted. That number obviously pales in comparison to the number of ARC transactions. To date, it seems that Congressional efforts to push electronic truncation have failed. Alternative technologies have emerged that make electronic truncation far less important than banks had predicted.[193]

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[189] *See* NACHA statistics releases, available at http://www.nacha.org/news/Stats/stats2005/2nd%20Quarter%202005.pdf (1st and 2nd Quarters); http://www.nacha.org/news/Stats/stats2005/4th%20Quarter%202005.pdf (3rd and 4th Quarters)

[190] MANN & WINN, *supra* note 32, at 559-60.

[191] Larry Taft & Nathan Halmrast, *Early Experiences with Check 21*, Payment Systems Research Briefing (April 2005), available at http://www.kansascityfed.org/PUBLICAT/PSR/Briefings/PSR-BriefingApril05.pdf

[192] *See* Tara Rice, *Implementing the Check 21 Act: Potential risks facing banks,* 217 Chicago Fed Letter (Aug 2005) at 3. Apparently, the few checks that are presently converted are of particularly high value, for they account for 10% of the total value of checks. *Id.* This development is in itself somewhat disconcerting. As the author notes, banks are probably converting larger value checks, rather than lower value checks, because the bank can obtain "the float earned off the earlier availability of funds." *Id.* Because the banks have no obligation to pass these savings on to customers, *see id.* at 4 n.5, Check 21 simply presents banks with an opportunity to gain additional profits with no improvement in services for customers. Congress did require, in Check 21, that the Federal Reserve investigate whether the funds availability laws and regulations (primarily the Expedited Funds Availability Act and Regulation CC) should be updated in light of Check 21, but to date there have been no changes. Mark Budnitz, *Consumer Payment Products and Systems: The Need for Uniformity and the Risk of Political Defeat*, 24 Ann. Rev. Bank. & Fin. L. 247, 258 (2005)

[193] A recent Wall Street Journal article suggests that Check 21 is facilitating the use of ATM machines that can create a digital image of a check, thereby enabling the consumer to use a "no envelope" deposit. There is no indication, however, that Congress foresaw this development, which underscores the point that the

In this particular case, the failure of the hard shove seems costless because there has been little political backlash, either in the aftermath of the legislation's passage or in the face of its apparent ineffectiveness. But the Check 21 saga illustrates that in applying hard shoves on behalf of industry, the government risks political backlash in situations where the results are uncertain. When the European Union mandates the euro, or the Canadian government mandates the loon, they can be pretty sure that they will succeed. But when the government seeks to get involved in promoting private payment networks, the outcomes are far less certain, which should caution against government entanglement.

B. Electronic Giros

In our Check 21 example, substitute checks became less relevant in the wake of ARC technology. Another possibility is that the technology the government seeks to promote will remain important, so much so that it will eventually take off on its own, without governmental intervention. An example from Europe helps illustrates this point.

Getting consumers and merchants to switch from paper-based transactions, such as checks or giros,[194] to electronic payments over networks results in significant social economic benefits.[195] As such, a switch to electronic payments is to a country's economic advantage. In addition, we can assume that most merchants prefer electronic payment systems because they receive their money more quickly. But European countries vary widely in the extent to which electronic payments are made. For instance, in the Netherlands, the vast majority of non-cash payments are made by electronic "credit

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government is usually ill-suited to predict how technologies will develop. Robin Sidel & Ian McDonald, *The Envelope-Free ATM; Banks are Testing Verstions to Read Checks, Count Cash; Twizzlers Wrapper is Rejected*, WALL STREET JOUR., May 8, 2006, at B1.

[194] A giro is a transaction in which the consumer issues a directive to her bank to pay a particular creditor. It is frequently distinguished from a check as a "push" rather than a "pull" transaction: whereas a check requires the creditor to go to the consumer's bank and request payment (i.e., pull funds from the consumer's account), in a giro transaction, the money is sent to the creditor's account as a result of the consumer directing her own bank to make the payment (i.e., the consumer has pushed funds from her account to that of the creditor). A giro transaction bears a great deal of similarity to the direct deposit transactions through which many employees are now paid. For a further explanation, *see* http://en.wikipedia.org/wiki/Giro (last visited Mar. 20, 2006).

[195] David Humphrey et al., *Benefits from a changing payment technology in European banking*, __ J. Banking & Fin. ___ (forthcoming 2005) (manuscript at 2) (suggesting possible savings of up to 1% of national GDP, and documenting averge savings of 0.38% of national GDP).

transfers" (essentially electronic giro payments).[196] Such payments are rarer in Greece[197] and Portugal.[198] Instead, Greeks have continued to use checks and paper-based giros for the vast bulk of payments, and have adopted credit cards in large numbers for small-value transactions. In Portugal, the data suggests that checks, but not paper-based giros, compete with electronic giros for payments. These national differences are no doubt the result of both historical patterns of making payments as well as the price structure of various payment forms.

With regard to the price structure of payments, the story is one with which a reader should be very familiar: banks expect that consumers will respond to price incentives; that is, banks anticipate that consumers will use electronic alternatives if they are cheaper than the paper equivalent. But consumers rarely pay directly for such services; instead they pay indirectly, through the loss of the "float" on paper checks or through lower interest on account balances. No bank wants to be the first (and possibly only) institution to start directly charging customers for services they had perceived as free.[199] Again, the issue is a variant of the classic network effects problem. So how can one country make the switch more quickly than the other?

Between 1990 and 2004, Norway and the Netherlands experienced significant changes in the way that consumers paid for point-of-sale transactions.[200] Electronic payments, however, took off more quickly in Norway than in the Netherlands. This is because, in Norway, customers were charged a per-transaction fee for their use of both electronic and paper payment systems, with the electronic generally cheaper.[201] Norwegian banks were able to overcome the risk of losing customers by coordinating the timing of when per-transaction fees would begin.[202] While ordinarily, this sort of collusion would draw the attention of antitrust officials,[203] they did nothing to prevent it. Per-transaction fees were also encouraged by Norway's central bank. Not surprisingly,

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[196] EUROPEAN CENTRAL BANK, BLUE BOOK: PAYMENT AND SECURITIES SETTLEMENT SYSTEMS IN THE EUROPEAN UNION AND IN THE ACCEDING COUNTRIES 245-46 (2006) (26% of payments and 86% value of payments in 2004), available at http://www.ecb.int/pub/pdf/other/bluebook2006addenden.pdf.
[197] Id. at 155-56 (7.5% of payments and 12% of value of payments in 2004).
[198] *Id.* at 271-72 (6% of payments and 54% of value of payments in 2004).
[199] Bolt et al, *supra* note 88, at 2
[200] *Id.*at 3
[201] *Id.* at 2.
[202] *Id.*at 2
[203] The banks did not coordinate the amount of per-transaction fees, which could be zero.

Norwegian consumers reacted to the price incentive by moving away from the old system to the new.

But while change did not happen quite as rapidly in the Netherlands as in Norway, it still occurred. In other words, even without a price incentive and the coordination that made the incentive possible, Dutch consumers eventually adopted the new payment systems. For instance, per person use of electronic giro payments in Norway grew 12% annually between 1990 and 2004; per person use of electronic giro payments grew 7% annually in the Netherlands during the same time period.[204] But in both countries, paper checks had almost entirely disappeared by 2004. Dutch and Norwegian consumers had replaced them with electronic giros payments, debit cards, and cash that was usually withdrawn through an ATM.[205]

A comparison of Norway and the Netherlands, then, suggests that sometimes the payment technology the government seeks to promote would have taken off without any legislative push, particularly if the technology is sufficiently advantageous to consumers and merchants. In these situations, the government bears the risk of political backlash, all for legislation that offers no genuine long-term benefit. And even in the absence of political backlash, legislating is costly. If the legislation prompts no change beyond what the market would have accomplished in its own time, then legislative resources are better spent elsewhere. Again, this cautions against government entanglement in private payment systems.

C. The Future of Payment Systems

Although predicting what is on the horizon of payment systems is a tricky endeavor, we are confident about what payment providers would like to see: an increase in the use of smart card transactions, which may also lead to more use of stored value card networks. Of course, to date, the American market has remained resistant and perhaps even hostile to both technologies. We have already noted the spectacular failure of the Upper West Side experiment with stored value cards in the late 1990s.[206] Most

[204] *Id.* at 5
[205] *Id.* at 3-4.
[206] *See supra* text accompanying note 12.

other trials in the United States have failed as well, even though smart cards and stored value cards have been successful in other parts of the world.[207] Analysts have attributed this to the United States' advanced telecommunications system, which ensures that debit and credit card transactions can be verified quickly and cheaply.[208] This infrastructure results in "relatively low fraud levels and relatively high levels of satisfaction among businesses and consumers within the current system."[209] As we have previously suggested, in order for an alternative payment option to succeed, some subset of transactions must exist in which the consumer will be better off if she uses the alternative option. For the most part, only United States consumers who are essentially required to use a smart or stored value cards (such as those consumers in transportation systems or on military bases,) have found these payment options beneficial.[210]

At present, it is difficult for us to see what benefits smart card technology will offer American consumers in retail transactions, at least in the near future. At present, speed appears to be the primary advantage of the technology: it does not require the entry of a pin number or a signature. For example, ExxonMobil's Speedpass allows drivers to purchase gasoline by waving the wand of the Speedpass in front of a reader. Chase Bank's Mastercard system similarly enables consumers to make small payments with a wave of a card. More radically, cell phone manufacturers have begun to experiment with similar service through their phones, a system that has already taken hold in some parts of Asia. But it is unclear whether speed is enough of an advantage to attract a critical mass of consumers. In addition, because of the recent trend among some merchants to forego a signature for small credit or debit transactions,[211] speed is suddenly not unique to smart card technology.

Of course, some recent developments may benefit smart and stored value cards. First, some consumers are becoming more familiar with these payment options, either because they utilize transportation systems in major cities, or because they have been

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[207] *See* Carol L. Clark*, Shopping without cash: The emergence of the e-purse*, Economic Perspectives, at 34, 34 (4th Quarter 2005). For instance, in Hong Kong, nearly 95% of residents carry the Octupus card, which is a stored value card that uses RFID smart card technology.
[208] *Id.*
[209] *Id.*
[210] *Id.* at 37-42 (examining six case studies and noting the success of military smart cards).
[211] *See* Deb Gruver, *Signatures Not Required for Small Purchases at Many Wichita, Kan. Retailers*, KNIGHT RIDDER TRIB. BUSINESS NEWS at 1 (March 26, 2004).

involved with a university that sponsors a smart or stored value card,[212] or because they have seen advertising by companies like Chase and ExxonMobil. In addition, increasing numbers of merchants are unwilling to accept checks for retail transactions.[213] The decline of the check may leave room for a new payment system, perhaps one that will appeal to consumers who have previously eschewed credit and debit cards. It is not clear to us, however, that smart or stored value cards can capitalize on this market niche.

At the same time, however, as payment providers invest resources in smart and stored value card options, there will be tremendous pressure for them to succeed. Of course, the key to any new smart card or stored value card technology will be ensuring sufficient use by *both* consumers and merchants. How precisely coordination of the demand by both sides can be achieved is not clear – if we knew, we would not be writing law review articles! But what does seem certain is that the competitive pressure to use these technologies, particularly smart card technology, is only likely to increase in coming years.[214] Against this background, it would be surprising if industry did not attempt to enlist government support for its new technologies. As we have explained, our view is that, in general, the federal government should resist such entreaties.

Industries' most likely request is that government require operators of new payment systems to increase interoperability. For example, consider the market for payments by cell phone. Interoperability issues could arise at two different levels. First, different cell phone companies may develop different technologies, with the result that only some cell phones will work in one location to make a payment, while other cell phones will work in another location. Second, cell phone companies may differ in what

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[212] *See id.* at 39-41. Of course, just because they have been exposed to such systems does not mean that the systems have always flourished. Clark compares the failure of the University of Michigan system with the success of the University of Central Florida system.

[213] Transaction costs and the risk of fraud are making retailers increasingly reluctant to accept checks from consumers. *See e.g.,* Claire Parker, *Retailers and Bankers Say Paper Checks on the Way Out*, THE FAYETTEVILLE (NC) OBSERVER, Jan. 5, 2006, at A12 (noting trend).

[214] Part of the pressure will come from the continuing decline in the use of checks, at least for retail transactions. As merchants increasingly decline checks, consumers themselves will (at the margin) cease to use them, setting in motion what Shapiro and Varian refer to as a vicious cycle of positive feedback. *See* SHAPIRO & VARIAN, *supra* note 42, at 173-77. Of course, this does not mean consumers will cease to use checks for non-retail transactions. But what some consumers will cease to do is take checks outside the home to make retail payments; what is the point if fewer merchants are accepting them? As the number of consumers paying by check decreases, more and more retail merchants will in turn refuse to pay for the technology needed to verify checks, leading the merchants to refuse to accept checks, etc. We posit that the decline of the check will open up the possibilities for other payment systems for retail transactions.

payment services they are willing to offer to customers. One company might allow its customers to select among accounts from which to make payments, while another company may require that customers only make payments through a credit card, perhaps even a particular bank's credit card.

Just as the Federal Reserve and banking interests sought congressional aid in mandating the acceptance of substitute checks, payments industry parties may seek assistance in gaining acceptance of a particular cell phone technology. In Hong Kong, for instance, nearly 95 percent carry the Octopus card, which is a stored value card that (like E-ZPass) uses RFID technology.[215] One of the main factors in the Octopus card's phenomenal success was the formation of a joint venture by the five largest public transportation providers to support the creation of a card that would work on all of their lines.[216] Similarly, the success of smart cards in Europe has been tied to the willingness of state telephone companies to mandate their adoption for pay phones.[217] For cell phone payment schemes to work in the United States, interoperability is also likely to be crucial; only interoperability will allow sufficient benefits to satisfy the heterogeneous preferences of a critical mass of consumers, which will in turn induce merchants to accept cell phone payments.

One quick means of increasing the possibility of a critical mass is for the government to mandate a particular technology.[218] Such a move would, of course, limit consumer choice among possible products. For instance, Cingular is testing a product in Atlanta that uses special RFID chips in cell phone handset covers to allow customers to make payments at Philips Arena.[219] In this product, the chip connects the cell phone with the customer's "exiting Chase credit card accounts."[220] An alternative product is Obopay, which provides consumers with software that allows them to receive and make

[215] Clark, *supra* note 207, at 36.
[216] *Id.* at 37. In contrast, Carol Clark notes that two similar systems launched by competing companies in Macau failed to succeed because of the lack of interoperability. *Id.*
[217] Shapiro & Varian, *supra* note 42, at 244.
[218] Note that the other possibilities for government action we discussed in Part IV are unlikely to be useful in this context.
[219] Eric Dash & Ken Belson, *Ring Up My Bill, Please: Mobile Payment Via Cellphone*, N.Y. TIMES, Mar. 21, 2006, at C1 & C4.
[220] *Id.*

various payments via their phone.[221] In the Obopay system, the phone itself is not used to make retail payments; instead, the consumer uses a special debit card that is linked to the Obopay account.[222] One possibility is that smaller existing payment providers will pressure the government to ensure that these new services provide access to not just particular accounts, but to all of a consumer's credit and/or deposit accounts.[223] On its face, such governmental intervention is appealing, for it would make such products attractive to a wider variety of consumers and thereby increase the likelihood of adoption. The rub is that the success of such systems is likely to require not just attractive services, but also the use of incentives.[224] For example, Obopay presently gives new users $10 in their account just for signing up. Incentives are costs, and those costs need to be internalized by someone. The most likely parties are existing payment providers. And if those providers are not guaranteed exclusive access to customers, they may fail to invest in the first place. In this context, then, government interference, far from increasing consumer choice, may actually undermine it.

Stored value cards present a similar problem. Notwithstanding the success of Octopus in Hong Kong, stored value cards have usually failed in the United States,[225] and have had mixed results in Europe.[226] Nonetheless, moving from cash transactions to electronic transactions promises significant savings for the United States economy,[227] so the interest in pushing this technology will remain.[228] One intriguing possibility, which is currently under discussion in Singapore, is for the federal government itself to actually

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[221] For information on the service, *see* Obopay's Press Release of Mar 30, 2006, available at http://www.obopay.com/info/PDFs/pr_33006.pdf.
[222] *Id.*
[223] Cf. Dash & Belson, *supra* note YY, at C4 (noting that big card issuers would prefer to limit access to accounts).
[224] *See also* Clark, *supra* note X, at 43 (noting the importance of incentives).
[225] *See generally* Clark, *supra* note X (noting some college programs and U.S. military programs as only successes).
[226] *See generally* Leo van Hove, *Electronic Purses in Euroland: Why Do Penetration and Usage Rates Differ?*, SUERF working papers (on file with author).
[227] *Cf.* Humphrey et al., *supra* note X; Leo van Hove, *Making electronic money legal tender: pros & cons* (unpublished manuscript, Oct. 5, 2005) (on file with authors) (manuscript at 16).
[228] The government itself probably has some interest in moving transactions out of cash and into electronic form. First, less use of cash means less wear and tear on cash, which means lower replacement costs. [Cite Fed Report on costs of cash replacement]. Second, electronic payments are easier to monitor, particularly for taxation purposes. *See* David Humphrey et al., *The future of cash: falling legal use and implications for government policy*, 14 J. Int'l FIN. MARKETS, INSTITUTIONS & MONEY 221, 222 (2004) (noting that as use for cash falls, it increasingly is used for tax evasion and other illegal activity).

issue electronic money.[229] A more radical possibility would be for the government to make electronic currency (rather than coins and notes) legal tender or to even abolish coins and notes altogether.[230] Any of these actions would necessitate the use of stored value cards; the stored value card would provide a means for the consumer to present her money to the merchant during point-of-sale transactions.

We will start with the most extreme option – replacing coins and notes with electronic currency. In this scenario, the government would be mandating the switch to a cashless society. Assuming such a decision was constitutional,[231] this hard shove would no doubt succeed, but would also be unwise. As we saw with the euro, overriding some consumers' preferences for preexisting cash systems can create short-term (and perhaps long-term) political backlashes that frustrate other governmental objectives (and thus provide a cost that may outweigh the benefits of change). A mandatory switch to a cashless society in the United States would likely be accompanied by even greater negative political consequences, particularly in light of the threat to privacy and the possibility that some consumers who could not master electronic currency technology might be pushed into the underground economy.[232] As a result, such a move is not only unwise, it is unlikely to even occur in the foreseeable future.

A slightly less radical option, however, is for the government to make electronic currency legal tender. That is, the government could simply mandate that electronic currency, like coins and notes, has to be accepted for all debts. This would also amount to a hard shove, although not nearly as hard as altogether abolishing coins and notes. But so long as it was clear that merchants need not accept electronic currency in point-of-sale transactions, the shove might well fail. As the examples of the dollar coins and two-dollar bill illustrated, just because a payment form is legal tender does not mean that a critical mass of consumers will start to use it. In the absence of demonstrably greater benefits for both consumers and merchants, many people may simply choose not to adopt electronic currency and the stored values cards that would accompany it.

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[229] *See* Leo van Hove, *Making electronic money legal tender: pros & cons* (unpublished manuscript, Oct. 5, 2005) (on file with authors) (manuscript at 13).
[230] *Id.*
[231] *Cf.* text accompanying note X, *supra* (discussing *Legal Tender Cases*).
[232] *See* Van Hove, *supra* note 229226, at 26 (on social exclusion) & 32-33 (on privacy).

An even gentler approach would be for the government to indicate that *it* would accept electronic currency for all debts (most prominently, of course, for tax payments). This would amount to an incentive for consumers to use the system. As with a legal tender statute, however, the problem with both this possibility (and the even gentler one, that is, that the government simply issue electronic money) is that it is by no means clear that the governmental intervention would work. Certainly, government willingness to issue electronic currency payments and to receive them would give both consumers and merchants a further incentive to *adopt* stored value card systems. But as we have noted, the adoption and use decisions are separate. It is far from clear that in either case, the government actions would be enough to get consumers to use electronic currency on a day-to-day basis, particularly if it remains relatively easy to convert electronic currency into coins or notes.[233]

Moreover, the stronger the governmental shove towards stored value cards, the greater the risk that the government will stifle competition in the electronic payments industry. Because stored value cards are currently not a necessity, there is competitive pressure for payment providers to entice consumers and merchants with special incentives and services. Payment providers also have an incentive to continue to develop new technologies that expand the appeal of their products. Any governmental action that forces stored value cards upon consumers and merchants is likely to cut off these sorts of innovations and incentives because they will no longer be necessary to ensure widespread use of stored value cards. The potential for stifling competition in the payments industry, then, is another reason why government should rarely intervene in the private payments industry.

Conclusion

Close your wallets. As we have discussed, whatever payment options you found inside it are the result of both platform economics and incremental changes in payment

[233] Say, for example, the federal government begins issuing tax refunds in "digital dollars" and that such digital dollars are fully convertible to dollar bills. Given the current technology in place, consumers would have no particular reason not to continue to withdraw the digital dollars from their accounts in the form of cash, rather than as stored value. It is only when the digital dollars cannot be converted, for example, when coins and notes are abolished, that consumers have an incentive to use the stored value card.

technologies over the course of the last 50 years. The government has the ability to influence these platform economics, either with gentle measures or with strong ones.

But although the government does not have to worry that its attempts to influence consumer and merchant preferences will end up reinforcing the very payment options it is seeking to replace, it nonetheless must exercise caution. Not only do politicians have to worry about political backlash, but such intervention may have consequences that the government cannot foresee. By the time the government acts, the "new" payment method it seeks to support might already be on its way towards obsolescence, the payment alternative may be capable of flourishing without governmental intervention, or the intervention might stifle competition in the payments industry. Nonetheless, as payment providers strive to put their products in your wallet, they are likely to ask the government for help when they believe it is necessary.

One thing is certain. When our children open their wallets 50 years from now, they are likely to find payment alternatives that are very different from the ones we use today. But the explanation for why our children use these payment methods is likely to be the same as the one offered in this paper. No payment alternative will succeed unless it can attract adequate users on both sides of the platform. What will be interesting is which emergent payment systems follow the upwards trajectory of credit and debit cards, and which go the way of the two-dollar bill.

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